The Builder.

VOL. XX.—No. 999.

Researches at Halicarnassus.

R. NEWTON has been far more prompt in giving to the world an account of his explorations at Budrum (the ancient Halicarnassus)* than was our old friend Professor Cockerell in placing upon record the narrative of his researches made in Ægina and Arcadia in 1811, and which were reviewed by us in our columns just a year ago.† Mr. Newton's expedition, which was commenced in the autumn of 1856, and brought to a conclusion, as most of our readers are aware, in the middle of 1859, has resulted in bringing back to England a very considerable portion of the sculpture which once decorated the magnificent tomb of Mausolus, erected at Halicarnassus, in memory of that king, in the middle of the fourth century, B.C.; and which is now housed, and likely, we fear, to remain for some time housed, for lack of better accommodation, inside some unsightly sheds of black deal boarding, scarcely wind and weather proof, lately erected between the pillars which adorn the front of the British Museum. That they should have no better home is a sad disgrace,—we will not say to the trustees of the Museum, for we believe they are nearly helpless in the matter; but to her Majesty's Government, and to the British nation at large; and we trust that the present session will not be allowed to pass by without our being able to record that something definite has been done towards finding a local habitation for the art treasures with which private enterprize, aided by grants of a few thousand pounds, has recently enriched our national collection from the shores of Caria, from Cyrene, and from the east of the Mediterranean.

Mr. Newton's account of his own explorations at Halicarnassus is a very scholarlike production; and no one can fail to be pleased with the plain unvarnished narrative in which the author has recounted the labours in which he bore so large a share, and in which he has so disinterestedly contrived to turn the attention of the reader to the history and antiquities of the ancient Budrum, rather than to his own labours in bringing those antiquities to light.

A good deal of narrative relating to the excavations carried on by Mr. Newton, and the force employed under his directions, on the coast of Asia Minor, has already been made public in the shape of papers printed by order of Parliament, in 1858 and 1859; but Blue Books, as a rule, are not very generally read or studied; and, therefore, we think that he has not acted wrongly in giving a full statement of his labours and their results in the present volume. We have not room for more than a very cursory glance at these operations: this, however, is the less to be regretted, as we have before now given particulars of them from time to time.

It is well known that the tomb of Mausolus has given a name to all isolated buildings subsequently erected for the sepulture of the dead; and we learn from the pages of "Eustathius," that the mausoleum was still standing in the twelfth century: it is equally a matter of history that when the knights of St. John took possession of Budrum, in A.D. 1402, it was a mass of ruins, and that they used those ruins extensively as a quarry for the erection of their castle. "The first materials made use of would naturally be the marbles from the upper part of the edifice, which were lying *in situ*, detached by their fall, such as the steps of the pyramid, the architrave and slabs of the frieze. As the ruins were thus gradually cleared away, and the tomb became more accessible, the stylobate and marble facing of the basement would be stripped off, till nothing of the edifice remained but the solid core of the masonry."

It appears that this process must have gone on for nearly a century; for, when Cepio visited Budrum, in 1472, he speaks of only "*vestigia inter ruinas mausolei.*" These "*vestigia*," as soon as they were levelled with the adjacent soil, became fainter and fainter, as Thévenot, the celebrated French traveller, who visited Budrum just two hundred years ago, notices the slabs of marble inserted in the walls of the castle, but clearly shows by his silence that he was not aware that these were relics of the grand and gorgeous mausoleum on whose site he was treading, and which once took rank as one of the seven wonders of the world.

In 1846 Lord Stratford de Redcliffe, then our ambassador at the Ottoman Porte, procured a firman authorizing the removal of these slabs from the castle walls at Budrum, and sent them to England in H.M.S. *Siren*. They had not been long in England when Mr. Newton, in conjunction with Professor Cockerell, drew up a "memoir" of these sculptures, which was published in the "Classical Museum" (vol. v., pp. 170—201), in which they endeavoured to determine the site of that building; fixing it on the very spot which Professor Donaldson had assigned to it some years previously, and on which Mr. Newton's subsequent excavations have proved that it stood. As, however, some distinguished travellers and surveyors entertained a different opinion as to its exact position, Mr. Newton visited the spot in person early in 1856.

Returning to England forthwith, and having consulted with Mr. Panizzi, Mr. Newton laid the importance of having the site excavated before Lord Clarendon, then Foreign Secretary, who placed at his disposal the services of a lieutenant of Engineers and a party of Sappers and Miners, together with a photographic artist, and also a ship of war, for six months, together with funds to the extent of 2,000*l.*

Arriving at Budrum at Christmas, 1856, they commenced operations on the following 1st of January, in a field which appears to have been laid out in gardens belonging to several different owners, and where the soil was full of splinters of the finest white marble. After considerable difficulties, they came upon fragments of friezes in high relief, and pieces of moulding identical with that of the slabs of the frieze brought home to England from the castle in 1846. Convinced that they were now upon the right track, they pursued their excavations with redoubled vigour, and in the course of a few weeks were able to trace the line of the foundations and pavements from south to north. Mr. Newton writes,—

"Having met with no vestige of these foundations to the west of this line, while there was a distinct return at its southern extremity, I assumed that this return was the south-west angle of a rectangular area, cut out of the solid rock, to receive the foundations of the mausoleum.

Knowing, from Pliny, that the circumference of the building was 411 feet, and that it was longest from east to west, I measured off approximately the lengths of its western and southern sides, examining the ground minutely, with a view to discovering the north-west and south-east angles. No trace of this latter angle presented itself: but a few feet to the north of the great stone there was an abrupt and strongly-marked depression of the ground, the distance of which from the return on the south was rather more than 100 feet. Thinking it probable that the north-west angle might be found here, I opened the ground, and, to my great satisfaction, came upon a very distinct right angle, cut in the native rock, one side of which, if produced to the south, would join the line of cutting on the west. The distance of this angle from the return on the south was 108 feet, which gave me the dimensions of two sides of the quadrangular area of the foundations. I next proceeded to explore by digging the ground on the east, till I found the south-east angle, at the distance of 127 feet from the south-west angle. Having obtained these data, I proceeded to purchase, and cleared away, all the houses, four in number, which stood on the site of the quadrangle itself. The difficulty of negociation being very great, a delay of several months occurred before I obtained possession of the whole of the ground; but, having finally removed both the houses and the superincumbent soil, I laid bare the whole area of the quadrangle. The result of this excavation is best seen in the plan and sections.

It will be seen by reference to these documents that the quadrangular area in which the foundations of the mausoleum were laid was cut in the native rock in beds of very various depths, the lowest part of the area being on the west side, where, under the great stone, the cutting is 15 feet below the natural level of the rock; while on the east side the bed rises within 4 feet of it. The whole of this area had been filled up with the courses of the foundations, consisting of slabs of a coarse green stone, strongly bound together with iron clamps, and generally measuring about 4 feet square by 1 foot thick. In some places as many as three courses of these foundation slabs remained; in others a single course, which, when first uncovered, had the appearance of a pavement, and is described as such in my earlier despatches. In other spots the whole of the foundation courses had been removed, and the original bed of the rock was laid bare.

The whole quadrangular area in which these courses still remained measured 127 feet from east to west, by 108 feet from north to south—dimensions which sufficiently correspond with Pliny's measurement for the entire circuit, which is 411 feet according to one reading, and 440 feet according to the other."

This discrepancy of 29 feet is accounted for by Mr. Newton by supposing that if the former reading be correct he must be supposed to exclude, and if the other be true, to include, the lowest tier of the foundations.

In the course of the excavations a number of architectural fragments, including the whole of the order, were found. These discoveries are embodied in a restoration by Mr. R. P. Pullan, accompanied by a number of plates of details and by a minute and careful description. Into the merits of Mr. Pullan's restoration, we have previously to some extent entered. The whole subject evidently needs much further consideration; and all that has been done as yet by Messrs. Newton and Pullan is but the preparing the ground on which the architects of this and other countries may make further speculations; for it must be acknowledged that, in spite of the addition of so many new architectural facts, Pliny's problematical description of the building still remains a case whereon to try the ingenuity of both commentators and professional men.

Farther and deeper excavations (described in chapter v.) revealed the fact that the platform of the peribolus occupied the site of an ancient quarry and cemetery, and laid bare a flight of steps, as well as some subterranean galleries round the quadrangle, and the sepulchral chamber itself in which the Prince of Caria was enshrined. Among the lesser, but not less interesting articles, which were thus brought to light, were a terra-cotta vase in the form of a female head (engraved at p. 124), a very interesting specimen of archaic modelling; an alabaster vase, bearing the name of Xerxes in two languages; and a very small ivory elephant, obviously a votive offering. To the above we must add many fragments of colossal horses, lions, chariot-wheels, and male and female statues; all of which are to be seen by any one who will take the trouble of paying a visit to the British Museum. They have been almost all described minutely, and do not therefore need to be particularized here, further than to say that in their general character they correspond very closely with our preconceived and traditional notions of the school of Scopas, and combine a happy union of the ideal and the real. Thus, for instance, the head of Mausolus is evidently a portrait taken from the life, though treated in an ideal manner. Mr. Newton shows apparently very satisfactory grounds for believing that the figure of Mausolus was represented as standing on the quadriga, with his left hand resting on a sceptre, and that the female figure, of which fragments were found by his side, was the goddess-chario-

* A History of Discoveries at Halicarnassus, Cnidus, and Branchidæ. By Charles T. Newton, M.A., keeper of the Greek and Roman Antiquities at the British Museum; assisted by R. P. Pullan, F.R.I.B.A. Vol. i., plates; vol. ii., Part I., text. (Day & Son, lithographers to the Queen. 1862.)

† See vol. xix., pp. 133, 153, 189.

teer; and also for believing that the fragments of a horse or horses, though together they would scarcely make up a single horse, are in reality constituent parts of two horses, and not of one only. There are several other fragments and remnants of sculptures in relief, consisting of four slabs of the frieze of the order, and fragments of three other friezes, one of which represents a chariot race with female charioteers, and is supposed to have ornamented the wall of the cella.

All the slabs which have been preserved, including those removed from the castle at Budrum by Lord Stratford, repeat one of the favourite subjects of Early Grecian art,—the Amazons; but in the composition, it is remarkable that the figures and groups are far less intermixed than is the case either with the frieze of the Parthenon, or with that of the Temple of Apollo, at Phigaleia, described so picturesquely by Professor Cockerell; and Mr. Newton remarks with justice on the "wonderful animation and energy which pervade the whole series." He writes:—

"A happy boldness of invention is shown in the incidents which represent the varied fortunes of a combat in which neither side can claim a decisive victory. A consummate technical knowledge is applied throughout, to render expression of each figure and group as intense as possible; and proportions are boldly exaggerated, in order to produce more telling effects. Tried by the standard of the school of Phidias, and viewed simply as a composition in relief, without regard being had to its original architectonic purpose, the frieze may, perhaps, be considered a little strained and overwrought in style. It may be thought that such intensity in the action needs the contrast of forms expressive of repose, such as we see introduced so skilfully into the metopes of the Parthenon and the Phigaleian frieze. We seem to miss, too, in the whole treatment of the subject, that grand Ethical spirit which pervades the art of Phidias, and which is especially noticeable in the groups where a mortal struggle is represented. We have not, as in the metopes of the Parthenon, the highest human heroism contrasted with mere brute passion; but the combatants on both sides seem, in some groups, to be animated with a rage which masters rather than develops the nobler part of their nature. In short, this composition, if compared with similar subjects, as treated by Phidias, seems less Ethical and more Pathetic. Moreover, in the representations of the Amazons, forms occur which seem rather too voluptuous for such an heroic type; and we may here detect the first germs of that sensual element which gained so powerful an ascendancy in the later schools of art, but of which we have no trace in the works of Phidias."

Mr. Newton does not fail to remind us, however, that in judging of the effect of this series, we must not forget that the figures do not form a continuous composition, that distance would tone down and harmonize many of the features which appear exaggerated on a nearer view, and that the whole frieze was coloured. All these, we must admit with him, are points which must have contributed to give distinctness and animation to the entire composition, and to unite the several groups in one great harmony. It is remarkable that, as is the case with the Temple of Apollo Epicurius, at Phigaleia, already alluded to, the Amazonomachia formed the subject of one frieze, while the Centauromachia formed the subject of the other.

Those of our readers who would wish to follow out the subject further, and to trace out the unity of plan and purpose which marks the above compositions, in spite of the diversity of artists by whose hands they were wrought, we must refer to Mr. Newton's work itself, pages 230—260, where they will find some useful materials for a new chapter in the history of Greek art, but which we have not space to transfer to our columns: we will therefore content ourselves with adding here the author's conclusion of his critical remarks upon the subject.

"The ideal portraits of this (the later Athenian) school may be regarded as the last great effort of Greek art; but in the attempt to invest living personages with the characteristics of divinity, sculpture itself fell, because it forgot its earlier and nobler aim, and allowed itself to be diverted to secular purposes. Hence, if we assume that the statue of Mausolus was the crowning feature in the whole composition to which it belonged, this work has a peculiar significance in our eyes. In that case we must regard the Mausoleum as a cardinal point in the history of ancient sculpture, marking the commencement of that great innovation which was consummated by the conquests of Alexander, and forming the boundary-line of two schools—the later Athenian or Pathetic school, and the school of Lysippus, which we may perhaps call the Realistic school."

Mr. Newton concludes his account of the Mausoleum with some happy illustrations drawn from classical descriptions of eastern tombs, showing how the chamber of the dead was furnished. The ancients of every civilized country believed that in a future state their dead heroes would follow the pleasures and the pursuits to which they had devoted their lives on earth; and this will account for the costly carpets, robes, embroidery, and couches, which, according to Arrian, decked the tomb of Cyrus, the great founder of the Persian dynasty; and for the iron sword, whips, and bow-case, found in the Scythian tomb discovered near Kertsch, in the Crimea, not ten years ago; to say nothing of the well-known passages in which Herodotus alludes to the inner chambers of the huge sepulchral piles of ancient Egypt.

Mr. Newton closes his volume with a chapter on the general topography of Halicarnassus and its neighbourhood, and two others on his minor excavations on the sites of a Roman villa, a supposed gymnasium, and a necropolis. The results of these researches are mostly to be seen in the British Museum.

It is almost premature to criticise the volume of plates, in elephant folio, which Mr. Newton has given to the world; and for this reason, because they contain the plans and illustrations of the excavations carried on not only at Halicarnassus, but at Cnidus and Branchidæ, to which at present we have no corresponding text, though we believe that we are right in asserting that the remaining instalment of the work will appear in a few months. On its appearance we may perhaps deal more critically with the subject: at present we will only say that the volume contains a most complete set of illustrations to the published volume on Budrum, and that it supplies the reader with all that is necessary to enable him to comprehend the text.

In conclusion, it should be remarked—the more necessarily so as one reviewer made a blunder in dealing with the subject—that the present volume of text is only an instalment (though a very large instalment) of Mr. Newton's work, and that he has reserved for a separate volume the narrative of his discoveries at Cnidus and Branchidæ.

ON PICTORIAL MOSAIC AS AN ARCHITECTURAL EMBELLISHMENT.*

A FEW words will suffice to dismiss the sixth species of mosaic, which I have called "*Italian portable.*" By this term, I would convey that the basis of the variety is not so much making portable mosaics; as, from the great weight of the materials, they can never be made easily portable; but rather making reproductions, in mosaic, of pictures in oil or other media, which may be really and readily transferable from place to place. This species is, in fact, little else than a revival of the fine *opus vermiculatum* of the ancients. It would be incorrect to say that the Greeks did not ever manufacture miniature mosaic pictures; because two noted specimens exist, to my knowledge,—one at Florence, and the other, of extraordinary perfection and curiosity, in the Kensington Museum but it may be safely averred, from the great rarity of such relics, that the practice was altogether exceptional. This, indeed, is not to be wondered at; since, with the quick-drying cement ordinarily used for mosaic work, it must have been extremely difficult to execute these almost microscopic pictures, which bring within the compass of a few square inches subjects usually worked out in as many square feet.

This leads us to the conclusion that the ancients for their finest mosaic pictures must have used some retarding agent, such as honey or beer would prove, to keep their cement plastic longer than it would remain if mixed with water only. When, however, Giovanni Baptista Callandra applied, early in the seventeenth century, a mastic in lieu of an ordinary hydrate of lime, to unite the tesseræ, it became comparatively easy to copy the most elaborate pictures in mosaic. By this artist was executed the beautiful reproduction of Guido's St. Michael; which, with Raffaelle's "Transfiguration," and Domenichino's "St. Jerome," is about the best of all the celebrated mosaic pictures in St. Peter's.

In the marble incrustation which forms our seventh species, and which is best known as *Florentine mosaic*, the tints and shades are given by the natural colours of the jasper, agates, and other precious materials of which the work is composed. The hardest minerals only are used; and, as each small piece must be cut and ground to a pattern, and each thin veneer backed by a thicker one slate, or some such material, in order to give it strength; so much labour and time are involved in its production that its high price has necessarily limited its use. Zobi, the principal writer on the art of *pietra dura* mosaic, tells us that he knows of "no existing example in Italy of marble pictorial mosaic executed during the first periods of the revival of the arts, excepting the specimen to be seen in the central nave of Siena Cathedral, said to be the work of Duccio di Buoninsegna, who lived in the fourteenth century." There can be no doubt, however, that the art was founded on the "opus sectile" of the ancients, and that it descended by regular tradition from classical times. I need scarcely recall to your recollection the extraordinary advance made in the pavement of the same cathedral upon the work of Buoninsegna, by that great master of the sixteenth century, Beccafumi. The art was greatly patronized by the Medici. The celebrated "Fabrica Ducale," of Florence, was founded by Ferdinand I., Grand Duke of Tuscany, in 1588; and its reputation during the seventeenth century was kept up by the exertions of those artists to whom Florence owes the finest specimens of mosaic which enrich her palaces and galleries, and whose names are for the most part given to us by Baldinucci.

Before taking leave of this subject, we must not omit to notice the exquisite specimens produced in India of pictorial mosaics, representing the finest Arabesque and conventional ornament in *pietra dura*. That the Indians were early in possession of all the technical ability necessary for such a work is proved by the antiquity of some of their gem-cuttings, inlaying, polishing, and carvings in hard stones; but it is probable that their sovereigns owed much to Italy for assistance in that beautiful marquetry which ornaments the great monuments at Delhi and Agra; for in 1688 a passport was obtained from the King of Spain, by the Grand Duke of Tuscany, for four workmen, skilled in mosaic working in precious stones, whom he was about to despatch to the Great Mogul.

This art is retained at the present day both in India and to even greater perfection in Italy; for the specimens contributed to the recent Exhibition at Florence, some of which may be even now on their way to this country, were quite equal to anything produced in the palmy days of the Medici.

It would take too long now to describe the practical processes adopted in this and other modes of mosaic working; and, having already given them in a work I published in 1848 on the subject, and in a report to the Board of Trade made in 1855, it is better to refer you to those sources of information than to further detain you from entering upon what is, indeed, the most practically interesting section of our inquiry this evening. Before commencing, however, upon the second part of our subject, the theoretical basis upon which we should, as architects, aid in the revival of pictorial mosaic, it behoves us to take stock of the present state of the material conditions likely to affect any such revival. In Italy, as I have already said, the art has lingered on;

* By Mr. M. Digby Wyatt. See p. 199, *ante*.

maintained in its monumental form by the necessities of repairing old works, rather than by the desire to create new; and in its portable form by the incessant demands of foreigners to carry off with them, as pilgrims' marks in the nineteenth century, slabs of what is generally known as "Roman mosaic." In France, under the first Republic, an effort was made to introduce this manufacture into Paris; and a "fabrica" was opened by the authorities, under the charge of a Signor Belloni, in the old College of Navarre, in the Rue de la Montaigne, Ste. Génévière. At the "Exposition" of the year X., some products were contributed from this establishment; but as it altogether disappears from the catalogue of subsequent expositions, there is every reason to believe that the experiment was abandoned. With this exception I am aware of no attempt made by France hitherto to revive pictorial mosaic. I have not heard of any other efforts, making or made, in any of the other countries of Europe, excepting our own.

Before noting what we are doing in this direction, it may be well to record the progress making in Italy. There are now three establishments in "*Italia*" (supposing it to be "*unita*"), at all of which I believe the *smalti*, or coloured vitreous paste requisite for mosaic working, are made, and from which they may be procured. These are each attached to great structures, the mosaics of which require occasional repairs; viz., St. Peter's, at Rome; St. Mark's, at Venice; and the Benedictine establishment at Monreale, near Palermo. Of the products of these establishments, the Roman and Venetian are the best, and the Sicilian the cheapest. Through the kindness of Mr. Penrose, of whose exertions in connexion with the revival of mosaic I shall presently have occasion to speak, I am enabled to bring to your notice the following particulars of the relative cost of the products of these establishments. At the Roman Fabrica he was furnished with an estimate for the execution of mosaic (of course, in very fine work) for "*opere di decorazione*," at the following rates, reduced to English feet and English money:—For figure subjects or landscapes, at from 23*l.* to 38*l.* per foot superficial; for flowers or animals, at from 23*l.* to 31*l.* per foot; for Grecian, Roman, or cinque-cento ornaments, at from 19*l.* to 27*l.* per foot; and for Byzantine ornaments, at from 3*l.* 17s. to 11*l.* 10s. I cannot help thinking that there must have been some misunderstanding with respect to the above estimate; for such prices might justify the very minute work requisite for copying highly-finished pictures, but are altogether unreasonably high for ordinary decorative work. I am led to this conclusion because Ciampini tells us that, when Clement VIII., in the beginning of the seventeenth century, commenced the embellishment with mosaic of the dome of St. Peter's, the price offered for the labour was about 1*l.* 10s. per English foot. This was so profitable to the workmen as to attract the labourers from all parts of Italy "*fama tam immodici pretii.*" The consequence was that very speedily the price fell to about 7s. 3d. per English foot. This would be, of course, exclusive of the value of the material employed, which latter would be worth, then, probably about 15s. an English foot. Allowing for a great increase of value since Clement VIII.'s time, it is hard to suppose that similar work could be worth more than about 3*l.* sterling per foot at the present time. This would agree pretty well with what the director of the mosaic establishment at St. Mark's,—Signor Moro,—told Mr. Penrose; viz., that the cost of finished work, similar to the ordinary Byzantine, would be about 3*l.* 2s. per English foot. With respect to the cost of the Venetian material, I have myself obtained from the Count Conaro the prices at which Signor Salviati, the practical manufacturer who makes for St. Mark's, will supply the *smalti*, viz., for gold and silver, 12s. per pound, cut into tesseræ; 6s. for the same quantity uncut. For varied colours, 3s. per pound uncut. Count Cornaro states that it will take about 33 English pounds' weight of gold and silver, or 50 pounds of coloured smalto to do a French metre superficial of mosaic; the French square metre being rather more than an English superficial yard. Mr. Penrose remarks that, at Palermo, the price is much the same as at Murano for the smalto, but that the price for cutting it into small pieces is very much lower in the former than the latter place: thus the prices for cutting only, at Murano, are, for coloured smalti, 6s. 8d.; and for gold, no less than 15s. 6d. per English foot; while at Palermo, for 4s. 7d. per foot, the manufacturers will cut up into tesseræ golden and coloured *smalti* indiscriminately. Mr. Penrose's object in making these inquiries was to ascertain how far it was practicable to enlist foreign assistance in carrying out some of his proposed decorations in St. Paul's in mosaic, of a more pictorial nature than we had at the date of his last visit to Italy succeeded in producing.

The notes he made become now, happily, of less importance than they then were; owing to the fact that with the exception of the gold ground mosaic which our manufacturers have not yet, so far as I am at present informed, been very successful with, all the other foreign pastes may be with advantage replaced by home produce, and the work done by English workmen. The actual purchases made by Mr. Penrose for the purpose of experimenting upon were as follows:—1,200 cakes of gilt smalto, sufficient, when cut up and wrought, to cover about 80 feet, English, 63*l.*; 332 lbs. avoirdupois of coloured smalto, sufficient to do about 128 feet, 35*l.*

In the recent Italian Exhibition tho Florentine and Venetian mosaic workers alone were well represented. Salviati, the manufacturer, and Vincenzo Redi, the mosaicist, both of Venice, combined in contributing a fine figure of St. Nicholas, taken from Sta. Sofia, at Constantinople; and an equally good one of our Saviour, copied from an original in St. Mark's. Both of these left nothing to be desired in the way of material or workmanship. Antonio Gazetta, also of Venice, exhibited a very good head. I saw nothing, however, at Florence in these works; which, with the exception, perhaps, of the good quality of the gold ground smalto, we could not, I believe, now rival in this country. It remains for us to see by what steps this newly-acquired faculty has been obtained.

The revival of mosaic in this country as an architectural adjunct may be considered to have begun in 1839-40; about which time Mr. Blashfield endeavoured to produce decorative pavements by means of inlaid asphalte, coloured cement, and Venetian pisé works, assisted, by the clever inventions of Mr. Singer, of Vauxhall, by his ingenious assistant, Mr. Pether, and also by Mr. Prosser's mode of producing a tile of great density and closeness of texture, by subjecting powdered China clay to strong mechanical pressure in iron moulds, and in this way obviating the shrinking caused by evaporation, which is unavoidable when the clay is used in a moist state. Mr. Prosser's invention was first applied to the manufacture of buttons, in which for some time a large trade was carried on. Recently the Messrs. Maw have invented a process by which they obtain tesseræ with the close texture and consequent hard surface, only to be attained by aqueous shrinkage, and hitherto only approached by subjecting the materials to extraordinary pressure.

Mr. Minton, I believe, at the suggestion of Mr. Blashfield, turned his attention to the application of Mr. Prosser's patents to the production of tesseræ suitable for the formation of pavements similar to those of the ancients. Many beautiful geometrical combinations for this purpose were suggested by Mr. Owen Jones; and the result of Mr. Minton's spirited efforts was the speedy introduction to the market of excellent tesseræ in all colours.

In 1844, when I went abroad to study my profession, Mr. Blashfield gave me a commission to obtain for him anything which I considered likely to render these tesseræ (the manufacture of which Mr. Minton had then just entered on) of more general utility. In Italy and Sicily I found much material, of which I believed little notice had at at that time been taken; and this induced me to make a series of drawings, which I afterwards published in the "Geometrical Mosaics of the Middle Ages." These drawings were shown to Mr. Minton by Mr. Blashfield; and, on my return to England in 1847, Mr. Minton applied to me to assist him in his views with respect to encaustic tiles, and their combination with tesselated work in general. For some time I rendered him what aid I could; and, but for other and more pressing professional engagements, I should probably have continued to do so. On Mr. Minton's retirement from active business, Messrs. Maw & Co., determining to add the execution of mosaic to their encaustic tile manufacture, sought my co-operation, which has been given, at such intervals as have suited our mutual convenience, up to the present time. Feeling their strength quite equal to the production of pictorial as well as geometrical mosaic, Messrs. Maw requested me, on the announcement of the intended Exhibition of 1862, to design a pavement of that character for them. Some of the working drawings for that commission I now exhibit; and do not doubt that, on seeing the work done from them in the Exhibition, you will admit that Messrs. Maw & Co. have fully proved their capability to rival any antique mosaic yet exhumed in this country. To have attempted successfully such an experiment, involving the production of an indefinite number of tesseræ of about one hundred different tints—many never previously got up in England—and the application of skilled labour as it had never before, I believe, been employed in this country since the last Roman quitted it,—is, I do not hesitate to say, highly honourable to them as manufacturers; and it is a source of gratification to me to have been associated with them in this the first practical endeavour to revive pictorial mosaic amongst us. That we shall soon have many rivals is not to be doubted; since already, through the energetic and most laudable prompting of Mr. Cole, a scheme has been set on foot to which no one amongst us can, I think, fail to give hearty sympathy and support. Some prospectuses, one or two of which I have laid upon the table, give the detail of a scheme, which, if carried out successfully, as I have every reason to think and believe it may, will give a rare impetus to the development of pictorial mosaic. Those details I do not dwell on; for the double reason that time will not now permit of my doing so, and that they will, I believe, form the subject of a paper hereafter at the Society of Arts. I may, however, point to two most hopeful features of progress certainly made; viz.,—1st. That already the practical co-operation of many of the most celebrated artists in this country has been secured; and 2nd. both Messrs. Minton and Messrs. Simpson (Messrs. Maw & Co.'s London agents) have proved, that if artists will only make good designs, they possess all the requisite power to realize their designs successfully. To prove this, I need only point to a specimen produced by Messrs. Simpson, which has been kindly lent me by Mr. Cole.

Such being the actual conditions of the manufacture at the present moment, I think it will be admitted that it is really incumbent on the studious architect to endeavour to grasp the theory of the right application of pictorial mosaic; and it is in the endeavour to either aid him by my advice, or to aid myself by eliciting a rectification of my views, that I put before you, as the second and concluding part of this paper, a few convictions on the subject, with respect to which I see my way at present pretty clearly.

The combined action of the moisture and severe frost of our climate is such as must always, I fear, render but little durable any extensive application of mosaic in small tesseræ as external decorations: to a great extent, therefore, architects will have to look upon it as an internal embellishment. It is, of course, a coloured incrustation applicable to any structural surfaces which it may be desirable to enrich; and its appropriate design must be strictly determined by very nearly the same laws which should govern the distribution of polychromatic decoration, executed through any other medium upon similar surfaces. The rationale of these laws has been by no one better illustrated than by Sir Charles Eastlake, in his invaluable reports to the Fine-Art Commission; and it is better that I should refer you to what he has so well written in those documents, than attempt to give you now any paraphrase of my own. The chief exceptional conditions are, firstly, its expense, which entails simplicity; secondly, the extremely vivid way in which it reflects light, and exhibits local colour partially, demanding judgment to adapt the design to the mode of lighting; and, thirdly, its limitations, under ordinary circumstances, as a means of artistic expression, which lead to the prudent avoidance of many of those pictorial elements, such as perspective, foreshortening, lively action, or complicated chiaroscuro, which are proper and agreeable sources of effect in mural paintings, executed with more tractable vehicles. That which the designer will probably at first feel to be his greatest difficulty, the arrangement of the cement joints which attach the tesseræ to one another, will, when once he has mastered the principles upon which they should be disposed, prove a ready and most essential means of heightening his effects. The jointing is, to a mosaic designer, exactly what the lines and reticulations of an engraving or etching are to an engraver; and the rules of taste which apply to the one apply equally to the other. For instance, as the engraver's lines by convexity or concavity express the undulations of drapery, and the modelling of surfaces advancing to or retreating from the spectator's eye, so precisely should the directions of the jointing of a piece of pictorial mosaic. Again, as the regular ruling or cross-latching of an engraved half tint is made to give value to the broken lights and shades of the leading figures, to which, by their vivid contrasts, attention has to be attracted; so precisely

should the uniformity of the jointing with even-sized tesseræ diminish the brilliancy of a mosaic background; breaking up the light which would otherwise be so strongly reflected from, say a white or golden background, as to quite kill the effect of the figures or ornaments to be relieved upon it. Another point which should be carefully attended to in arranging the jointing is to allow a row of tesseræ of the same colour as the ground to always follow every leading contour profiled upon the background. The use of this rule, which was invariably followed by all good mosaicists, is to prevent the directions of the generally horizontal and vertical jointing lines of the background from cutting awkwardly against the profiles; which the eye should be allowed to follow without being led off into other channels, or distracted by the occurrence of irregularly shaped tesseræ next to leading forms. This reduplication, as it were, of mosaic outline, has almost the effect of the lead line in stained glass, and is not much less essential to good effect. It is highly gratifying to observe the degree of judgment with which the mosaicist has emphasized the designer's intention, by a judicious treatment of the jointing in Messrs. Simpson's specimen head now exhibited. It is always to be remembered that at the distance from the eye at which mosaics are usually likely to be placed, mechanical defects disappear, but that artistic mistakes betray themselves, despite the most perfect mechanical execution. Hence it is far better to spend time, thought, and money, in getting really first-rate cartoons, than in endeavouring to bring the tesseræ to fine joints, or microscopic minuteness. In mounting to the summit of the great dome of St. Peter's, glimpses are caught from time to time of the nature of the mosaic work; and the observer who, from below, may have fancied the whole to have been wrought with great exactness, will find that the work is of the coarsest description, with joints in which often a good-sized pencil might be laid. From its judicious design, however, the effect of the whole is eminently satisfactory when viewed from the floor of the cathedral.

It may be well to remember also that although mosaic is, as it were, painting, it is something more in its relation to the structure it decorates: it has become "bone of its bone," and in virtue of its intimate and permanent union is especially bound to live in peace and harmony. As a good wife should make conspicuous the virtues of the husband she adorns, should hide his faults, and screen his defects; so should a well-devised system of mosaic give, by predominant vertical lines, height to a structure in which height is wanting; and, by predominant horizontal lines, length where length is needed. Brilliancy may be wrought out of darkness by allowing gold grounds and luminous colours to prevail; while the eye in another building, "faint with excess of light," may be refreshed by a preponderance of cool and quiet tones. Stringcourses and borders, archivolt and impost bands and friezes, should be treated as permanent frames to permanent pictures; essential, by their rectangularity or other simple geometrical character, to afford the eye a ready means of testing all adjoining and more complex forms by contrast. Need I say that where the skeleton of the picture's composition is tossed about in lively action, a stronger boundary of more vivid and contrasted hues must enclose it as a corrective, than when the motive power of the picture is of a quieter and simpler structure? That is the reason why the great Venetian pictures demand such massive framing; while the more serene compositions of the early Florentine and Siennese schools look best when separated one from another by little else than narrow bands of flat and softly-tinted ornament. In the same way in mosaic, the rigid saints of the early Byzantine school, with their evenly-balanced limbs and perpendicular draperies, need little else than vertical palm-trees or inscriptions, or even upright staves placed between them, to keep them architectonic; while the later corresponding figures of the Italian school, with their swaying lines, require often actual insertion into niches to keep them even reasonably quiet.

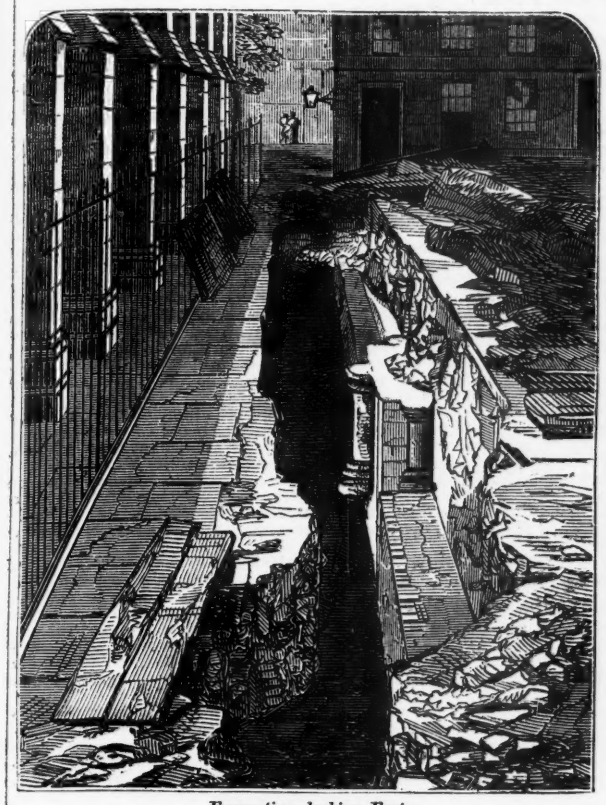
Such are a few of the most important theoretical points which have occurred to me; but had time permitted, I would willingly have entered this evening upon,—what I have indeed partly prepared,—an analytical sketch of the different artistic conventions, which form graduated stages between the crudest mode of, as it were, symbolising nature, and the most highly perfected form of imitative art. While an intimate acquaintance with the specific conditions of each of these stages —which are to the designer what keys are to the musical composer—will be a great assistance to the mosaicist; an ignorance of, or an indifference to, them will lead him into great trouble and confusion.

In bringing this paper to a close, I may be permitted to say a few words with respect to specific style, as affecting pictorial mosaic. We have seen that, as a decorative art applicable to monumental structures, it has survived every fluctuation and vicissitude which have affected architecture from the Christian epoch to our own time: as certainly will it outlive the little differences which split us up into Goths and Greeks—"big and little endians" of the professional golden eggs. We are now probably on the eve of introducing a new element into our national art; and happily one which may, with precedent, and therefore with a good conscience by those who lean heavily on precedent, be used alike in buildings of whatever historic style we may any of us peculiarly affect. Let me then express a hope that it may not be considered necessary to retain the defects and mannerism either of too much or too little academic knowledge, peculiar to ancient, mediæval, or modern times; but that we may rather concur in doing the very best we any of us can with this art, without pedantry or a slavish deference to the past. The whole history of monumental and industrial art has shown us, that never is perfection attained in any product in which the material conditions, and the processes by which those conditions may be best enhanced and developed, have not formed the basis of the the theory of construction, manufacture, or application, of any such product. This has held good of glass, stone, wood, marble, and of all the metals; and assured am I that, if we are to make this art of pictorial mosaic a credit to the nineteenth century, a similarly "objective" spirit must also direct and determine the specific mode in which, under every varying condition of style and historical association of ideas, we would endeavour to rival the great masters of old in their use of this time-honoured embellishment.

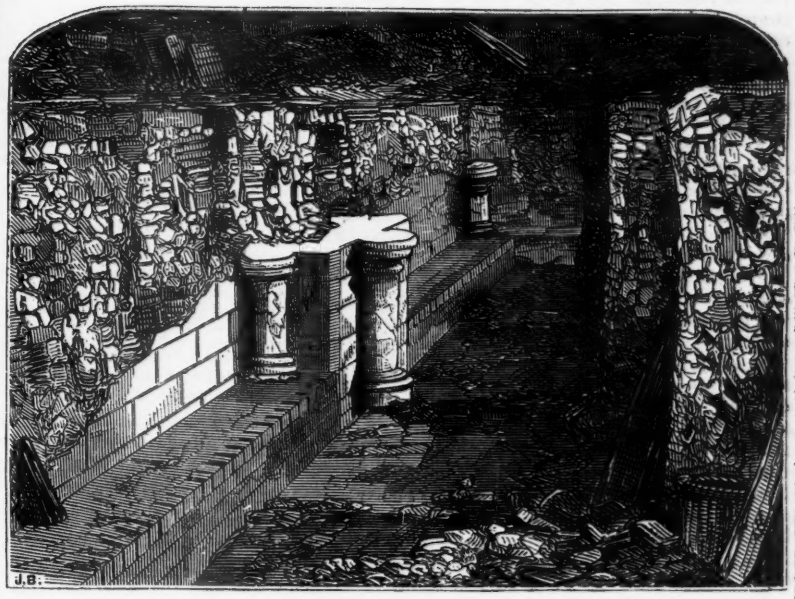
THE SISTER ARTS IN RELATION TO ARCHITECTURE.

A LECTURE on this subject was lately delivered by Mr. E. W. Godwin, in Northampton. In the course of it the lecturer said,—The question arises—What influence have the sister arts upon architecture? I am bound to confess, and to our shame be it spoken, that at present they have not the slightest influence in the world. If you are about to build a house, accommodation and cost are the great considerations. If we can get a certain number of rooms, of a certain size, at a certain cost, we are, generally speaking, content. Sometimes, if we are at all *artistically* inclined, we have an elaborate front elevation, about which we discourse very learnedly as to its classic proportions, and talk as if to the manner born about pediments and porticoes. It never occurs to us to ask for what purpose the poor wretch of a carver is compelled to repeat acanthus leaves *ad infinitum*, or whether there is any real merit or art in a hundred yards of eggs and anchors stuck on end; and yet these are the sculptural beauties which are forced upon us every day. We drag them down our streets, and twist them round our country houses, till the thing becomes as if it were a disease infecting everything around us; and, like a leprosy, attends us even to our very tombs. So, again, in the wide province of colour; no orders now for rooms to be painted green, with stars of gold; no more commissions for border fantasies or medallions painted with histories of the good and the wise: this is far too Mediæval for us. *We* are not such heathens as to require pictures of Dives and Lazarus, or St. Martin and the beggar, to keep alive our sympathies as we sip our claret in the soft light of crimson-curtained dining-rooms. Wild unmannered scrolls of red and yellow torture themselves into madness on the walls: impossible flowers in the most impossible of positions climb frantically over the most impossible of trellises; but *we* care not. In our self-satisfaction, and luxury, and pride, we never *see* such things in any other light than as the last French fashion, for which we have paid the very best price. You will say, perhaps, that we are advancing from this sluggish condition, and that I have taken an extreme view of the case. I wish in my heart it were so. I am rather inclined to fear that we are but changing from one fashion to another — going through the same diluting and stereotyping process with the Gothic and Italian as we have gone with the Greek and the Roman, without taking so much as one step towards the reconciling of the sisters, or the unity of art. I am well aware that there are exceptions; but, as a rule, I feel assured the public take no living interest whatever in ART, taken in its fullest sense, and freed from all the shackles of *style*. When the authors of those suburban villas which are scattered in discordant ugliness amidst our dearest bits of scenery shall have learnt to express, by the harmony of their works, the love they bear, or ought to bear, for one another; when round arch, and Gothic arch, and straight lintel shall meet together in amity; when perfect and grotesque humanity, and natural and conventional beauties, shall be chiselled in their proper place; when our mantelpieces shall incite us to thankfulness by its sculptures, picturing winter so that it may be deservedly likened to winter itself; when our walls are diapered by paint or paper, and powdered with medallions, or hung with pictures guiltless of heavy frames; when each room and each article of furniture shall be found to be but resolutions of the same key-note; when Royal Academicians and painters and sculptors of equal merit shall stand upon our scaffoldings, side by side with our architects, to hold affectionate counsel together, moved by the same principles, and actuated by the same motives; *then* may we hope to have an art of our own; then, and not till then, may we hope to see realized the picture on the "Art Journal" cover. There is nothing, believe me, visionary in this. Every man who desires to build himself a dwelling place which shall be to him as a *home* (for I refer not now to speculative building) may have all that I have said at no much greater cost than the ordinary outlay. And yet it is wonderful to note what little interest men take in their houses; while, to use the words of Sir Francis Scott, "there is hardly a man in England who keeps a horse but can describe, or imagines he can, all his animal's good points; takes a pride in doing so; and feels ashamed of himself if he cannot." And observe, the horse is a luxury that will last but a few years, the house a necessity which will last for centuries. I am sure there are artists—professors of each art—who, if they but found you valued their studies and their services, would soon rival, if not eclipse, the works of the former times, noble as they are. It is upon the public mind that the ultimate fate of art depends; and therefore the public must be indoctrinated with art. If, however, people will continue to prefer ancient Greece to modern England; if they have more love for heathen Rome than for their own fatherland; if they will listen to ignorant upholsterers' opinions rather than to artists' suggestions, if they are determined to be advised by the jobbing mason instead of the educated architect; if they will still purchase their enrichments and decorations at so much a yard; if they are bent upon machine-made buildings and manufactured ornament; then artists may strive and starve; for, in spite of all the zeal, and labour, and patience, and longing, of the painter, sculptor, architect; the age will be virtually unrepresented in the history of art. I say "*artists* may strive and starve," for the title is far too noble a one to be applied to those self-styled artists who are nothing more than panderers to and flatterers of that gross darkness and ignorance (all the more dark because of the glitter of its gold), which have taken root in so many hundreds of houses in this land; where, because it is fashionable, the so-called arts are, as a matter of course, patronized; and which, under the cloak of art, conceal the assassin's knife; ever ready to destroy, if it could, that reality and truth which constitutes, as it were, the life-blood of the sister arts. I know not why it should be so; but there seems to be a feeling that art is a luxury with which we may indulge ourselves according to our pleasure and our means; and that artists are our slaves, to minister to that pleasure. The feeling is by no means new. It arose with the spirit of Renaissance; and, until that debased spirit of wild voluptuousness and unrestrained freedom be subdued and cast out from among us as an unclean thing, the position of art, in all its nobility and in all the power of its moral and religious teaching, will never be fairly and fully realized. If, on the other hand, the arts were but united again, how great would be their influence upon one another! Painting would teach architecture to avoid those *sudden* transitions of colour which she has lately been indulging in; and no longer to riot in ill-arranged bands of red and white; having no earthly meaning unless it be to keep up a lively interest in the bacon trade. In our interiors she would teach us to subdue the colour of the walls and curtains; to note well those constant allusions to green and gold in the liberate rolls; and, if there be any pattern, to keep that pattern flat, conventional, and unobtrusive. She would tell us that flowers were not made to be trampled on; that green harmonizes with dark woods; and that purple is friendly inclined to-

THE REMAINS OF ST. ANNE'S CHAPEL; TEMPLE CHURCH, LONDON.



Excavation, looking East.



Excavation, looking West.

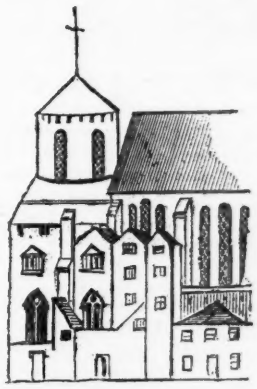
wards maple and the lighter woods. She might, perhaps, warn us to be jealous of ormolu; to guard against gold, white, and the three primary colours; and to use them like nature with such wise economy that their great glory may be seen and known.

Then, too, sculpture, if we treated her properly, would come out from her hiding-place, and show us how she could cut the histories of our cities and of our civil and religious freedom at the corner of every street, at a less cost than enriching cornices or balustrading parapets which people never strain their necks to look at; and, if they did, would certainly be none the better or wiser. She would tell us that the money we throw away upon eggs and anchors, to enrich the mouldings of our public buildings, would almost pay for large angle sculptures; which, while they softened the harsh angles of the walls, would convey some valuable lesson to every passer by. But then, of course, they must be near enough to be seen, not stuck up in pediments for the especial amusement of the servant girls over the way. Thus, over almost every doorway, certainly over the doorways of every public building, some expressive relief should shelter itself within the frame of the arch. * * *

And, now, what is the practical outcome of all this? In the first place, we should learn to look upon the fine arts (the knowledge of which an old writer has described as "the ultimate polish of a man") with reverence, and in a broad catholic spirit; and, in the second place, we should endeavour to know more of art, in order that we may see that artists have a higher mission in this world than the bare business of lodging us or ministering to our individual whims and fancies; and, lastly, we should all use the influence which we possess, be it great or little, in doing one act of love and kindness to a family which deserves to be treated well at our hands; but which, unfortunately, is at discord within itself; by labouring to unite its scattered members; to bring once more together the hands of the art sisters, that they may again rest in tender leanings upon one another's shoulders. History will tell you that it is *good* to do this. Your common sense and your own conscience will tell you *how* to do it.

RECENT DISCOVERY OF THE REMAINS OF ST. ANNE'S CHAPEL, IN THE TEMPLE.

The discovery of these remains has caused some excitement amongst the dwellers in both the Inner and Middle Temple. They were found while excavating in Lamb's Buildings, for the purpose of making a drain for the use of the new range of chambers which is nearly completed in Churchyard-court. While busy with this work, at a short distance to the south of the circular part of the



Exterior of the Chapel, from a Print in the British Museum, 1671.

Temple Church, the pillars shown in the distance of the western view were brought to light; when it was determined to extend the digging eastward. This has led to the opening out of the basement of south side of the chapel which formerly stood here.

The remains are in a very perfect state of preservation; and in one part the white plaster, with red lines, which represent stone courses, is as perfect as if it had been completed but a short time ago. The pavement seems at some time to have been removed; but it was originally situate at about 5 feet 7 inches below the present surface of Lamb's Buildings. The space which has been dug out has been filled in with chalk and rubbish; probably the remains of the roof, &c., of the chapel. At the west end are steps, some of them much worn, which have communicated with a doorway that formerly existed in the round of the church.

As to the origin of the church most of our readers will remember that to alleviate the dangers and distresses of the various classes of pilgrims to the Holy Land, after the capture of Jerusalem in the eleventh century, nine knights formed a holy brotherhood in arms, and entered into a solemn compact to aid one another in clearing the highways of robbers, and in protecting the pilgrims through the passes and defiles of the mountains of the Holy City. They called themselves the "Poor Fellow Soldiers of Jesus Christ," and renounced the world and its pleasures after the manner of monks. At first they had no church or particular place of abode; but, in A.D. 1118, nineteen years after the conquest of Jerusalem by the Crusaders, they had rendered such good service to the Christians, that Baldwin the Second, king of Jerusalem, granted them a place of habitation, within the inclosure of the Temple, on Mount Moriah; and thenceforth these soldiers were known by the name of "The Knighthood of the Temple of Solomon."

The name and reputation of the Knights Templars speedily spread throughout Europe; various illustrious pilgrims from the far west aspired to become members of the holy fraternity; and Baldwin, king of Jerusalem, foreseeing the great advantages which would accrue to the Latin kingdom by the increase of the power and numbers of these warriors, exerted himself to extend the order throughout all Christian dominions.

The order continued to increase in numbers and power; and, in A.D. 1128, Hugh of the Temple came from Jerusalem to the king in Normandy, and the king received him with much honour, gave him treasure in gold and silver, and afterwards sent him to England; and both there and in Scotland he received large sums, and grants of land as well as money.

As the houses of the Temple increased in number in England, sub-priors came to be appointed; and the superior of the order in this country was called the Grand Prior, and afterwards the Master of the Temple. Many illustrious knights of the best families of Europe aspired to the habits and vows; but none were admitted until they had proved themselves worthy by their conduct of such fellowship. As time passed on, the religious and military enthusiasm of the Musulmans being aroused, the Templars were worsted in several battles, and the Latin kingdom of Jerusalem was shaken to its foundation; then about A.D. 1146, the second crusade was arranged, and the Templars, with the sanction of the Pope, assumed the red-cross, the symbol of martyrdom, whence they became afterwards known by the name of the Red Friars, and the Red-cross Knights. The second crusade proved a failure after many vicissitudes.

The patriarch came to London in the reign of Henry II., and was received by the Knights Templars at the Temple, in the City, which was then the chief house of the order in Britain; and this, it may be remarked, was the second chief house of this order in London; the other, as we have mentioned elsewhere, being without Holborn-bars, on the site where Southampton buildings now stand. About two centuries ago, part of the old chapel annexed to this establishment, and which was of a circular form, and built of Caen stone, was discovered in pulling down some old houses near Southampton-buildings and Chancery-lane. The first house

proving too small to be suitable to the prosperous circumstances of the order, they purchased a large space of ground, extending from the White Friars' westward to Essex House, without Temple-bar, and commenced the erection of a convent on a scale of much dignity and grandeur. It was called the New Temple, and was adapted for the residence of numerous military monks and novices, serving brothers, retainers, and domestics.

The punishment of disobedient brethren was very severe. In the north part of the round church there may still be seen the penitential cell, only 4 feet 6 inches long by 2 feet 6 inches wide, in which unfortunate offenders were confined, but where no person of average growth could lie. In this place of little ease many were confined.

At the opposite side of the church, corresponding with the doorway of the staircase leading to the penitential cell, there were formerly another doorway and staircase which communicated with the chapel of St. Anne, which stood on the south side of the round.

This building, now re-opened, was removed during the repairs which were made in 1827, and was two stories in height. The lower story communicated with the round through a doorway formed under one of the arches of the arcade, and the upper story communicated with the body of the church. These doorways have been stopped up. These apartments were vaulted, and traversed by cross ribs of stone, and ornamented with bosses at the point of intersection. This chapel anciently opened upon the cloisters, and formed a private medium of communication between the convent of the Temple and the church. A plan of the chapel will be found in the "Vetusta Monumenta" of the Society of Antiquaries.

It was there that the papal legate and the English bishops had conference respecting the affairs of the English Church; and in this chapel Almeric de Montfort, the pope's chaplain, who was imprisoned by Edward I., was set at liberty at the instance of the Roman pontiff.

ON THE SEWERING OF TOWNS AND DRAINAGE OF HOUSES.*

TOWN-SEWERAGE on a grand scale is certainly co-existent with the Roman empire; and earthenware pipes are, probably, as old as the art of pottery. It has been ascertained that pipes of earthenware, "hand-thrown" on a potter's wheel, and not unlike, in form and dimensions, to hand-made pipes of the present day, were used throughout the East, in the remotest periods we are acquainted with, to conduct springs of water for human uses.

Earthenware pipes have been found beneath the great mound of Assyrian ruins; which pipes are supposed to have been drains; and the stalls in the Colosseum of Rome were drained with earthenware pipes. Earthenware pipes were also used by the Romans for watercourses.

The cloacæ of Rome, including the Cloaca Maxima, according to Livy, are as old as the reign of Tarquinius Superbus. Some authors declare that the construction of these public sewers must belong to an Etruscan nation, which preceded the birth of Romulus and Remus.

These old sewers, the ruins of which are to be seen in Rome to this day, were also "sub-ways" and sewers, having raised paths along the sides, and "side-entrances" for tributaries, from palaces and fountains. There were large cloacæ in the several cities throughout the empire, as mentioned in Pliny's letters to the Emperor Trajan. I have met in the works of travellers with descriptions of other ancient sewers and drains found beneath ruins in the East; the date of the formation of such sewers being lost in the darkness of antiquity. It is, no doubt, impossible to trace out the origin of sewers and drains: their "invention," construction, and use probably took place and commenced with civilization. We cannot, however, settle this point this evening. We have another purpose, namely, to discuss the uses and the abuses of sewers and drains at this day.

The Roman cloacæ were, probably, in many instances, of the character of the great sewers in this metropolis,—the Fleet, the Ranelagh, and others;—watercourses inclosed and arched to serve as sewers. The remains of sewers and drains found amidst ruins show us that their application was limited, and their uses only imperfectly understood. If sewers and drains had been generally in use amidst the populous cities and towns of antiquity, we should now find their remains abundantly. We know the extent of the Roman empire more fully and better by the buried remains of Roman pottery than by history, or than by any ruins or traces of ruins remaining on the surface. Brick sewers and earthenware pipe drains, if they had ever existed, would have been as enduring in their materials as frail pottery, or as the stone and brick cloacæ of ancient Rome and the drains of the Colosseum. We do not find such remains in abundance; and, therefore, conclude that a limited construction only took place for special purposes. The Roman cloacæ were originally under the superintendence of the censors; subsequently under that of the ædiles. The Emperors Agrippa and Trajan constructed many cloacæ during their reigns. We, in these modern times, divest our imperial Government of all such useful power.

Earthenware pipes, of 3 and 4 inches in diameter, were made in England more than half a century since, in Lambeth and in other places. Mr. Doulton, senior, can recollect their being made during this space of time; and I have received other evidence as to the make of earthenware pipes forty or fifty years ago in England. The first modern use of them for sewer purposes was suggested by Mr. Edwin Chadwick, C.B., soon after the year 1840. Mr. John Roe states in his Report to the Harrow Local Board of Health (1854);—"The introduction of stoneware pipes for general drainage arose from a suggestion made by Mr. Chadwick to me, in his desire to obtain smooth interior surface; and the first sewer pipes made for that purpose in the metropolis were for the Holborn and Finsbury office." In consequence Mr. Roe further states;—"immense benefit to sanitary measures has been afforded by the use of earthenware pipes, where judiciously applied and properly laid. They save fully two-thirds the cost of brick sewers; that is, where brick sewers for a town would cost 30,000*l.* the same town may be sewered by earthenware pipes for a cost of 10,000*l.*, and the cheaper pipes will effect the work far safer to health and life than the costly brick constructions." Combined back drainage is of the utmost importance in point of economy, and also in efficiency of working, where the drain-pipes are properly laid. There are many thousands of instances of successfully combined back drainage, in scores of towns, and complaints of failure or of annoyance are very rare. I do not think they amount to one per cent. upon the work executed. Mr. John Roe, in 1854, stated that, "thirty-six years previously (1818), two hundred houses on one estate in the Holborn and Finsbury districts had combined back drainage, and no complaint of their working or otherwise ever came in that period to the office." Mr. Roe further states, "in many country towns and places back drainage may be usefully adopted." This is the doctrine of the first Board of Health anticipated and confirmed. In some places back drainage will be impracticable, and of course should not then be adopted.

It is a great advantage to have a regular flow of water through any sewer. Drains are choked more from want of water than by having too much passed through them. Combine drains as much as practicable, lay them well, joint them evenly, properly, and smoothly, and there will be very few if any chokings.

Fully to understand the worst effects of want of sanitary arrangements in towns, we must go back to the days of the plague, sweating-sickness, and other similar diseases, and read up the literature of 1665 and 1700, by Nathan Hodges, M.D., on the Plague of London, 1665; a Discourse on the Plague, by Dr. Mead; an Essay on the Different Causes of Pestilent Diseases, by John Quincy, M.D, and others; until we come to James Lind, M.D., and Sir John Pringle,—the one on diseases in the navy, and the other on diseases in the army. We may then visit the cities and towns in the East, where plague rages to this day, and see the causes in existence which prevailed in England two centuries since, and some of which causes prevail even now. Filth, squalor, darkness, neglect, vice, crime, and premature death; an annual mortality of 40, 50, and 60 in the 1,000 regularly, with an increase up to 100, 200, and even, in some places, 500, or a moiety of the entire population in one year, of plague and general sickness; "the living too few to bury the dead." The annual mortality of England at present in towns ranges from 30 to as low as 15, and even 11 in each 1,000. It is thought that 15 ought not to be exceeded even in our towns.

The Sanitary Commission of 1855 in the Crimea showed what could be done for an army in the field, where the mortality fell below that of the same troops in barracks at home; the French army knowing no such abatement. When fever had been all but banished from the British army and hospitals, the French at the end of the war were said to be losing by sickness in hospitals at a rate of 5,000 per month. 15,000 men perished in hospitals during the last three months of the war, as per French army medical returns.

There are no doubt many causes for disease in excess; but overcrowding, defective ventilation, and surrounding filth seem to be the worst. Proper sewers and drains will improve a town, but will not do all that is required.

The causes of fever in Liverpool, previous to the year 1840, were overcrowded cellar dwellings. The causes in Glasgow and in Edinburgh are overcrowded upper rooms and attics. The narrow streets, crowded houses, and small rooms of many continental towns may be improved by sewerage, drainage, surface pavements, and regular cleansing. But many of the causes of disease in excess might remain.

"Sewer," according to Lord Coke, is a place where water "issues;" or, vulgarly, "sues," whence the word "suera" or sewers. There are laws relating to sewers from Magna Charta to recent times. Callis, on the law of sewers, is the great authority. These laws, however, relate to sea defences, weirs, rivers, estuaries, and land-floods, rather than to town sewers.

Many persons use the words sewer and sewage improperly: they should be used as—

Sewer, a public sewer in street or road.

Sewage, that which flows through a sewer—the fluid.

Sewers (or sewerage), the plural of sewer.

Drain, a tributary to a sewer from house, building, or court.

Drains (or drainage), the plural of drain.

Sewers were first constructed in London under an Act (6 Henry VI., c. 5), 1428, amended by Parliament in the reign of Henry VIII.; and since this period to the present time there have been many amendments and alterations of laws for regulating sewers, into which I do not propose to inquire. The streets of London were begun to be paved in 1533. The first sewers in London would no doubt be in the several valleys on the line of existing watercourses,—the Fleet Ditch, the Ranelagh Level, &c. These watercourses were arched over, and the drainage of the adjoining streets and houses passed into them.

Stowe states that, "Antiently, until the time of the conqueror, and two hundred years later, this city of London was watered (besides the famous river of Thames on the south part) with the river of the Wells, as it was then called, on the west; with a water called Walbrook, running, through the midst of the city, into the river of Thames, severing the heart thereof; and with a fourth water, or bourn, which ran within the city through Langbourn Ward, watering that part in the east. In the west suburbs was also another great water, called Oldborn, which had its fall into the river of Wells."

The Fleet Ditch* was no doubt originally (in ordinary weather) a stream of bright, sparkling, sweet, and wholesome spring water—a river of "wells." But as early as 1290 the monks of White Friars complained to the king that the putrid exhalations arising from the river of Wells, or Fleet, were so powerful as to overcome all the frankincense burned at their altars during divine service, and even occasioning the deaths of many of the brethren. The Fleet continued to receive additional impurities, until it became in the time of Pope—

> "The king of dykes, than whom no sluice of mud
> With deeper sable blots the silver flood."

Barges are said to have sailed up the Cloaca Maxima and the Fleet sewer alike; in both instances natural watercourses having been arched over and made receptacles of sewage.

Although the first formation of public sewers in the British metropolis dates so far back as 1428, by far the greater portion of the 1,500 miles of the main sewers in London have been constructed since the year 1824; Mr. John Roe having had the perseverance, honour, and credit of effecting more improvements in the main sewers of his districts, Holborn and Finsbury, up to the end of his period of service, than any other man. The improvement of adopting the egg-shape, in place of vertical sides for sewers, the introduction of side entrances, and means of flushing, and the experiments carried out by Mr. Roe and tables based on these experiments, are invaluable for the metropolis. Mr. Roe found the construction of sewers a matter of guess: he left it a matter of scientific certainty. If all the sewers of this great metropolis had been laid out and constructed on the plan proposed and adopted by Mr. Roe, in his divisions, vast additional sums of money would have been saved, and (humanly speaking) many lives prolonged: the flat-bottomed sewers which now exist would have had semi-circular channels; and the deposit which now accumulates and corrupts would have been regularly washed out, or periodically "flushed" out, at short intervals. Mr. Haywood has more recently done for the City what Mr. Roe did for Holborn and Finsbury.

The ventilation of sewers by vertical shafts and open grates in the centres of the streets was, no doubt, an improvement, though a very clumsy and disagreeable plan. Previous to the formation of these open ventilators, typhus and typhoid fevers prevailed in many houses connected by drains with the sewers and near the untrapped gully-holes. Mr. Fuller, a medical gentleman, in his evidence, 1834, states that eight-tenths of all the cases of typhus fever he witnessed he could trace to foul drains or foul gullies. The late Dr. Southwood Smith gave evidence to the same effect.

At present there is much injury effected by sewer gases passing through drains and into houses. In 1859, on the use of a disinfectant in the public sewers having a powerful odour, all the houses directly drained by these sewers were tainted, showing that there was a flow of air from the sewers to the houses. This should not be, and can only be avoided by external ventilation of each house-drain.

The progress of a nation may be measured by increase of population, by spread of education, by increase of commerce and wealth, by increased value of human life and respect for it, and by improvements in morals, in obedience to the laws of the realm, and in religion. We may read, in the eloquent pages of our great historian, Lord Macaulay, how England appeared about the year 1688. He wrote:—"Everything has been changed but the great features of nature and a few massive and durable works of human art. We might find out Snowdon and Windermere, the Cheddar Cliffs and Beachy Head: we might find out here and there a Norman minster, or a castle which witnessed the wars of the Roses; but, with such rare exceptions, everything would be strange to us. Many thousands of square miles which are now rich corn land and meadow, intersected by green hedgerows, and dotted with villages and pleasant country seats, would appear as moors overgrown with furze, or fens abandoned to wild ducks: we should see straggling huts built of wood and covered with thatch, where we now see manufacturing towns and seaports renowned to the furthest ends of the world."

The population of England, in 1690, was computed at nearly five millions and a half. The manners of the inhabitants were in accordance with the state of the country. In the northern counties bands of Scottish marauders fought with moss-troopers: the parishes were required to keep bloodhounds for the purpose of hunting freebooters: oxen were penned at night beneath the overhanging battlements of the residences: the inmates slept with arms by their sides; and, on a journey, it was necessary to carry provisions; for the country was a wilderness which afforded no supplies. Such was the state of England at the commencement of the year 1700, or little more than a century and a half since. To find a parallel to this state of things, we must now go to Russia in the north, and to the cities of the Sultan in the east. Here we may see vast tracts of land uncultivated, and without proper roads—the inhabitants wearing, and even working with, weapons of defence and offence in their belts or sashes—cities and towns reeking in filth—hovels for houses—food of the worst and poorest character—no security for person or property, human life having the least possible value—poor cultivation of land—no proper roads—in the towns no sewers, no drains, but a maximum of human misery and degrading vice in the East, and of drunkenness and ignorance in the North.

To ascertain the state of England in our own day, and at the present time, we must study in "blue books" the sanitary reports; and, although a commencement of sanitary work has been made, there are vast and wealthy populations living amidst cesspits and cesspools. The good work has, however, been commenced; about 400 cities, towns, and places in England having adopted the powers of the "Public Health Act," 1848; or of the "Local Government Act," 1858. The "Common Lodging-houses Act" of Lord Shaftesbury may be adopted; and, where put in force, the results are most beneficial.

The question of sewerage and drainage concerns the poor more than the wealthy;—firstly, on account of numbers; and, secondly, because of close crowding. The poor must live, or linger rather, in squalor, sickness, and misery, and die prematurely, in such habitations as are provided for them. The fatal room tenements in English towns, the mud cabins of Ireland, and the bothies of Scotland, all tend to fill our gaols, lunatic asylums, and workhouses. When shall we learn and fully comprehend the fact that it will be more in accordance with the requirements of civilization, and even more economical, to prevent vice, and to make virtue possible, rather than to expend all our energies on reformatories, to make home comfortable rather than to build and endow public libraries, lecture-rooms, and reading-rooms? Do not neglect these, but first make the poor man's home wholesome.

The preponderance of numbers is shown in the case of Manchester and Salford. From a return by the Poor-Law Board of the numbers and occupiers of dwellings in

* Read by Mr. Robert Rawlinson, C.E., at the Society of Arts, on the 19th instant.

* "Fleet." This name is derived from the rapid flow of water from the higher districts drained.

parliamentary boroughs, it is shown that in Manchester, in 1859, there were 64,426 separate dwellings, of which number 24,457, or 38 per cent., were of 10*l.* annual rental or upwards; 22,538, or 35 per cent., below 10*l.* and above 6*l.* rental; and 17,431, or 27 per cent., not exceeding 6*l.*; or, on the whole, about 62 per cent. at and below 10*l.* rental.

In Salford there were 20,156 dwellings; 5,205, or 26 per cent., of 10*l.* rental and above; 8,131, or 40 per cent., of 6*l.* and below 10*l.* rental; 6,820, or 34 per cent., not exceeding 6*l.* rental. Taking Manchester and Salford in one district, there were 84,582 dwellings, of which 29,662, or 35 per cent., were 10*l.* rental and upwards; 30,669, or 36 per cent., of 6*l.* and not exceeding 10*l.* rental; and 24,251, or 29 per cent., at and under 6*l.* annual rental.

Many of the houses below 8*l.* per annum rental are of faulty construction. They are generally in rows, back to back, having no back doors nor windows, no yard nor privy, no sink-stone, nor internal water supply. Many sleeping-rooms have no flue, nor adequate means of ventilation. Privies have to be used in common; and, of course, are not what the name implies: they are frequently ruinous, and sickeningly dirty. Experience has shown that numbers of families should not be compelled to use privies common to several houses, unless regular cleansing is enforced. Every dwelling-house should have its own convenience. It is a libel on the poor to say they will not care for their own comfort. There are thousands of instances to the contrary. In Manchester, for the poor, waterclosets are the exception. The local municipal regulations discountenance them.

The annual death-rate in Manchester is 30·56 per 1,000, or double the death-rate in some districts. The death-rate throughout the manufacturing towns of Lancashire and Yorkshire generally is high, and will continue to be so until better sanitary regulations are adopted and enforced. The excuse offered by the Manchester corporation is, "Supplying the poor with waterclosets would waste water and foul the rivers." Proper apparatus will prevent the first, and intercepting sewers the latter.

London shows a diminished death-rate in proportion to the abolition of cesspools, although the sewerage is most defective, and the river Thames is fouled. Many thousands of cesspools have been abolished in the metropolis; probably not less than 100,000, within the last twenty years; but many thousands remain. Mr. John Roe, and some of the other district engineers, improved many miles in length of the metropolitan sewers and drains; but there are still many miles in length ruinous and foul. London is, however, much more healthy than the manufacturing towns of Lancashire and Yorkshire.

Those who wish to experience the horrible character of the cess-pits and middensteads of Manchester, Liverpool, and other northern towns should study the statistics, as they are weekly recorded, of 1,200 and 1,400 such places emptied; and then make a few night inspections of the localities in the hands of the "night-men:" the stench is abominable; many times worse than the Thames at its worst. The rivers flowing through Manchester can scarcely be worse than at present. The Irwell, the Medlock, and the Irk, are a disgrace to our civilization. They are fouled from their sources to the estuary; and, if the erection of waterclosets could be absolutely prohibited, the construction of intercepting sewers should be made imperative. The solids of sewage can be precipitated; but agricultural land is the proper place and use for sewage.

In many cities and towns where sewerage and drainage are carried out, waterclosets are in general use. This is the case in the metropolis. For several years past some 1,000 soil-pans have been made and sold per week; or some 50,000 per annum; and they are of course used. In the cities and towns of Berwick-upon-Tweed, Alnwick, Morpeth, Carlisle, Lancaster, Halifax, Worthing, and many other places in England, the poor use this convenience and do not abuse it. In Manchester, 100,000 loads of night-soil are annually removed, at a loss of some 6,000*l.* per annum. In London the removal of dry ashes produces an income to the parishes.

There is no general rule for the dimensions of town sewers for populations below 100,000 in proportion to surface area; and any engineer who adopts the dimensions given in certain published tables will most probably make an expensive mistake for the district in which he is operating. The tables which are based on experiments made in the metropolitan sewers are no doubt correct and absolute for the districts from which they were constructed, and will be applicable to any other similar district, if all the peculiarities and contingencies are similar; but they are not applicable to towns generally. I have never used these rules, and should have caused great waste of money if I had done so. The science of engineering cannot be tabulated; and this truth ought to be inculcated on every student. As well say that all sorts of diseases can be cured with one set or sort of pills, as that tables of strengths of materials and dimensions of sewers can be relied upon, without the experience of practice. The published tables I allude to have worked injury, not only in Great Britain but all over the continent, where many sewerage works have been attempted. The civilized world looks to this country for practical information on this subject.

The recorded experiments of the best hydraulic engineers on the flow of water in open channels and in pipes may be relied upon. There is little to learn in this branch of hydraulics. Pipes have capacity in proportion to the squares of their diameters; and water obtains downward velocity in strict accordance with the laws of gravity, modified by friction in its thousands of forms. The invert gradient of a sewer is one element in the law of flow. The head of water and delivery are other elements, giving velocity and scouring power. I only object to tables of sectional dimensions for general use. The town of Alnwick, in Northumberland, with its 2,000 acres of drainage area, its 7,000 population, and some 1,000 waterclosets, is sewered by an earthenware pipe 18 inches diameter, and having a gradient of 1 in 400. Carlisle, with its 1,900 acres of drainage area, and 35,000 population, has an outlet sewer of 3 feet 9 inches by 2 feet 6 inches, with a fall of 1 in 700.

At Worksop the outlet sewer is an earthenware pipe, 15 inches diameter, laid at an inclination of 1 in 600. The population is upwards of 7,000, and the drainage area very large.

At Lancaster the outlet sewer is of brick, 5 feet 3 inches by 3 feet 6 inches, and laid at an inclination of 1 in 1,000. The population is about 15,000, and the drainage area considerable, having a rapid fall in some parts.

At West Ham, with an area of 4,730 acres, principally of flat water-logged marsh land, the outlet sewer is of brick, 5 feet 3 inches by 3 feet 6 inches, having a cast-iron invert laid level, and at low-water line of spring tides.

In all these cases the dimensions of the outlet sewers do not accord with the tables alluded to; and yet the sewers perform the work required to be done. Surface water and heavy falls of rain pass, as previously, over the surface; but there is not a duplicate system; nor do I advocate such.

At Carlisle the outlet is frequently blocked by land-floods; at Lancaster, daily, by tides; and at West Ham pumping is resorted to.

The first questions an engineer should ask himself with respect to any district or area to be sewered should be these:—"How have surface waters passed off up to this time without the aid of sewers or drains?" "Have any surface impediments been formed? if so, what are the effects? and can such impediments be removed?" "Have houses been erected and cellars excavated in improper places, and where injurious flooding cannot be prevented excepting at a ruinous cost to the rated property of the district generally?" "Can watercourses in the valley lines be deepened at a moderate cost?" and, "Can embanking and pumping be resorted to economically?" "Are there any mills and mill-dams which impede drainage and cause injurious subsoil—flooding regularly, and injurious flooding at intervals?" All these questions have a most important bearing on the dimensions of sewers.

It may look very egotistical, but I can better give an account of my own practice than that of any other person, and detail my own experience more confidently than stereotype it in tables, which, must, in such form, be misleading and injurious.

Natural streams down valley lines should never be converted into sewers. The maximum flow of water in such streams is to the minimum as three hundred or four hundred to one. Any sewer formed in such valley line, of sufficient capacity to carry off flood waters, would be much larger than requisite for the ordinary flow, and would become a cause of nuisance in dry weather. All valley lines should be improved, and the beds of natural streams should be preserved free and open for the escape of surface and flood waters. Sewers and drains should be of sufficient capacity to remove roof, yard, street soil, subsoil, and slop-water from the area drained during ordinary weather; and should be graduated to the amount of work to be done. Flood-water outlets or overflows into valley lines, or natural streams, to relieve the sewers during heavy rains, should be provided. There may be large gratings to remove surface storm waters at the outlet points of valley lines, but care must be taken not to make such places large stagnant cesspits.

All sewers and drains should be properly ventilated. This may be effected by connecting down-spouts with house-drains in proper situations; by connecting sewers with tall chimneys; or by providing, on the sewers and drains, ventilating shafts with charcoal filters for oxidizing sewer-gases. All sewers should have means of inspection, flushing, and cleansing provided. Sewers should be laid in straight lines, and with regular gradients. At each alternate change in direction, or alteration of gradient, a manhole or entrance to the sewer should be constructed. Agricultural drain-tiles are laid in straight lines. Ploughing, on the most approved plan, is also in straight lines. In both cases, truth and efficiency of workmanship are attained, and straight sewers and drains insure good workmanship. One defective link breaks the chain: one defective pipe-joint or defective yard of sewer is injurious.

Brick sewers should be formed of radiated bricks, set in hydraulic mortar. Pipes should be jointed with clay-puddle, or with cement, or mortar, or asphalte, according to the nature of the ground in which the pipes are laid. Great care should be taken in laying pipes in rock, in gravel, and also in clay. Many lines of sewer-pipes are injured by injudicious filling of a trench, or by a fall of clay or earth crushing the pipes. The inlets of all drains should be properly protected; and the openings should be reduced so that any substance entering the drain may pass freely into the main sewer.

Where a sewer or drain has once choked, and the ground is opened out for repairs, do not close it in again, but construct a manhole or lamphole, that any future obstruction may be removed at once.

Sewers and drains act as subsoil-drains to the full depth at which they are laid. In wet subsoils provision should be made for allowing subsoil-water to enter the sewers. A continuous flow of subsoil-water along a sewer or drain is generally an advantage, as the solids of sewage are more readily removed.

Neither sewers nor drains should be laid under new inhabited dwellings. If it be absolutely necessary to carry a drain under a house, the drain should be carefully laid, and the joints made perfectly tight, so as to prevent the escape of sewer gases into the adjoining subsoil. Many lines of earthenware pipe sewers and drains are ruined when laid in porous subsoils with leaking joints. The fluid sewage leaks away, and leaves the solids to accumulate and ultimately to choke the sewer or drain, as the case may be. Puddle should be used in such cases.

All junctions with main sewers should be made at a point above the ordinary water-level in such sewers; and, at the junction of branch or main sewers, the top of the sewers should be on the same level. Additional fall should be given at junctions or bends, to overcome increased friction. Junction entrances, provided for branch sewers and house drainage, should be protected by earthenware plates, or "disc-plugs." Street gullies should be small, compact, and double-trapped. There should be a sediment box, easily removed and easily replaced. Means of flushing should be provided in the gully, that choking of the pipe connexion with the sewer may be impossible. Large cesspit gullies are a nuisance. Small gullies of cast-iron are generally found the cheapest and best: increase the number of small gullies, rather than construct large cesspit gullies.

Fresh sewage, when properly diluted, filtered, or disinfected, may be passed into rivers, or into the sea, without causing nuisance or injury to fish. In arranging outlet sewers, provision should be made for applying the sewage to land in the immediate neighbourhood, for agricultural uses, by gravitation if practicable. Pumping by steam or other power is available. A town standing on ground having quick gradients requires special arrangements to break the rush of water down and of gases up. This can be done by breaking the line with a vertical fall, placing a flap over the mouth of the sewer, and ventilating at this point. The outlet ends of all sewers should be protected with a covering flap, to prevent the wind blowing in and driving back sewage gases. A cast-iron pipe, of comparatively small dimensions, on any river outlet-sewer, will pass the dry weather flow of sewage to and below the summer level of the river, so as not to be a nuisance.

It is not the special province of an engineer to enter into the question of diseases and their causes. There are many causes of disease other than filth, the result of no sewerage, or of defective sewerage; and even fevers may break out in a sewered town. Deficient and bad food, defective house accommodation, and overcrowding, intemperance, and excesses of any kind, mental excitement, improper and deficient clothing, all tend to disease. The foundation of social improvement and comfort is, however, proper sewerage. The scale may be arranged in the following order, as things necessary in towns for health and comfort to the highest degree:—

1st. Main-sewerage, house-drainage, and street-pavements.

2nd. Good house-accommodation; rooms for the sexes, separate, with full ventilation.

3rd. Wholesome food, pure water, and proper clothing.

Then may be added, baths, reading-rooms, and museums.

A city of palaces, museums, picture-galleries, and of cesspools, is a sorry affair—a place to avoid rather than to dwell in. The cesspools of Paris detract from the beauties of the city above ground; and who is to visit and dwell in the cities of the Continent generally, if they remain neglected? Climate is blamed for producing disease in excess and premature death; but my experience has taught me that in any country and climate we must look to the habits of the people; and within their houses, rather than to the climate, for causes of disease in excess.

The cost of town sewerage works is an important matter; and, as continental governments look to England, and especially to the British metropolis, it is only right that they should have some sort of rule to judge by. In my experience I find that towns of and below 30,000 of population may have complete sewerage at or below one pound sterling per head. Where a population is compacted into a small area, and means of outlet are not distant, as in the cities on the Rhine, the estimate of one pound sterling may be relied on. But large brick sewers, for men to walk and work in, must not be constructed. The sewers must be of small sectional area; and so arranged that they may be cleansed absolutely and perfectly without sending men in and through them.

All rivers and streams are natural outlets for drainage; and, since men have dwelt on the banks of rivers, surface refuse has been allowed to pass into and mingle with the waters. There is at present a great outcry against the pollution of rivers by sewers, and the killing of fish. The questions may be asked, "Whether is it better to pollute rivers, or towns and houses? to kill fish, or to kill men?" I do not advocate the pollution of rivers, but the application of sewage to land for agricultural uses. If it will not pay, in some cases, as a commercial speculation, make it compulsory, and pay the cost by rate. By far the most expensive process in any community is filth in cesspools beneath houses, or on the surface around human dwellings.

Proper sewers and drains deliver sewage at the outfall fresh; and in this state fish are not killed, but are fed. The putrid sewage flushed from the foul sewers of the metropolis during hot weather by a thunder-storm taints the river and poisons fish; but even in the hot summer of 1859 the mortality in London was low, although the Thames was foul. As cesspools have been abolished, the public health has improved; and, if all the sewers were of sectional dimensions, forms, and gradients (as they may be) to transmit fresh sewage, and not retain it until putrifaction sets in, the public health would be further improved. It is practicable to so improve and manage the public sewers of this metropolis, that sewage one day old shall not remain, but shall be in motion towards some outlet; and in motion there is safety, but danger in stagnation.

The full and proper ventilation of sewers and drains is of the utmost importance: drains should be so laid and arranged as to render contamination of the air within houses (by sewage gases) impossible. At present, the sewers of the metropolis, with exceptions in the City, as recorded by Dr. Letheby and Mr. Haywood, ventilate, for the most part, direct to the open air, by means of the vertical shaft from the crown of the sewer. The gases of decomposition rise direct out; and road dirt, stones, and grit fall in. The gases foul the air in the street, and the dirt, ground by traffic through the open grates, blocks the invert of the sewers. The proper way to ventilate is to form a side-chamber, or side-shaft, and to place charcoal in the passage of communication from the vertical shaft by the side-chamber, so that all the gas escaping may be oxidised. The side-chamber receives the dirt falling through the ventilating-grate: it cannot enter the sewers. House-drains may also be ventilated in a similar manner.

Dr. Stenhouse pointed out the true uses of charcoal in 1853. I commenced the use of charcoal for sewer ventilation about the year 1858; and Dr. Letheby and Mr. Haywood commenced their elaborate and valuable experiments also in 1858. I think I may claim to have been one of the first, if not absolutely the first, to apply the use of charcoal for disinfecting the sewage gases of an entire town, upon a general plan, as part of a sewerage system. I may instance Worksop, Buxton, and West Ham.

Cesspools may be ventilated through charcoal with advantage, where they cannot be abolished entirely, which is the only safe remedy. At the County Hospital, Winchester, a large cesspool, some eight feet diameter, is ventilated through a covering of charcoal. The arch covering of the cesspool was removed: a wire-work basket, about ten feet square, supported on iron framework, covers the entire area of the cesspool; and this is filled with charcoal, broken fine (like peas), to a depth of twelve inches. There is a roof over the charcoal to prevent its being wetted by rain; and the whole is walled in so as to leave a clear passage round. It is reported to answer fully: there is certainly no nuisance from cesspool gases at this point.

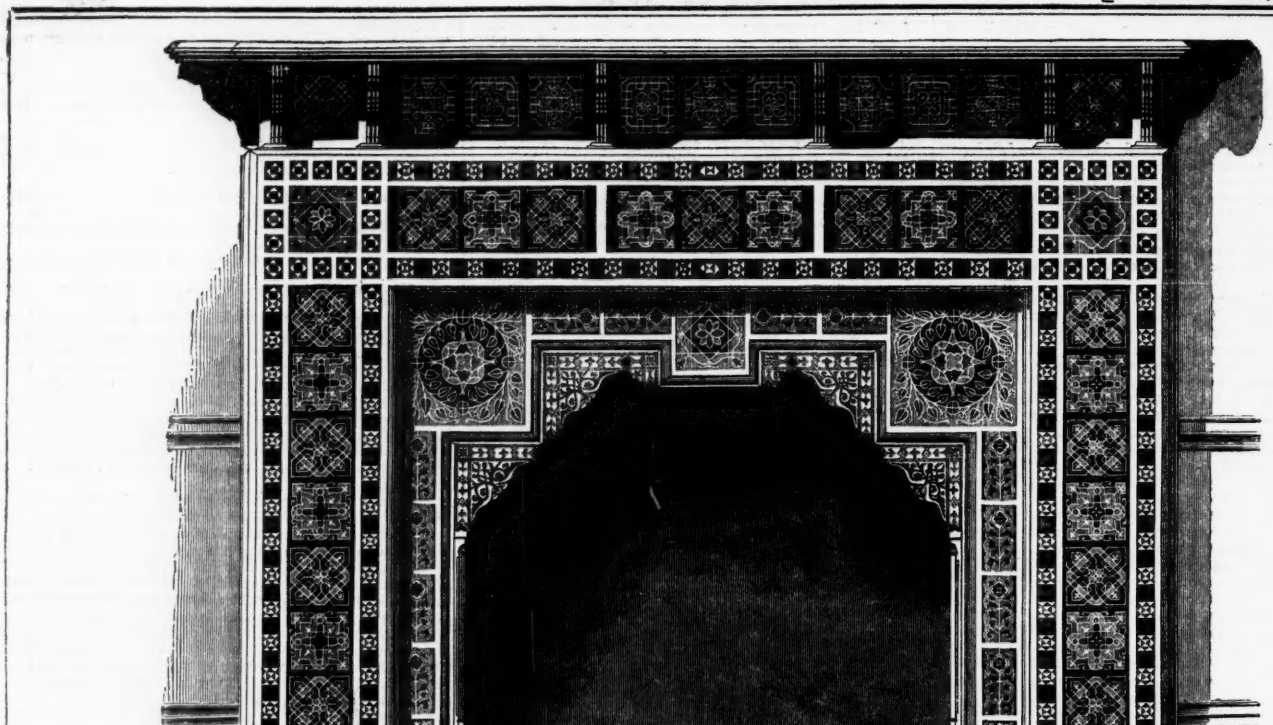
The following are details of sewerage works executed:—

CARLISLE.

The "drainage area" of the district sewered is about 2,000 statute acres.

The main outlet sewer for the entire area is 3 ft. 9 in. by 2 ft. 6 in. The sewer is laid with a gradient of 1 in 700. The outlet is extended to the centre of the river Eden, so as to deliver the sewage into the water of the river in the driest weather. The main sewer, and the low-lying portions of the city, may be relieved, by flood-outlets, of the drainage of 1,930 statute acres.

The "drainage areas" of the several "flood-outlets" may be described as follows:—



CHIMNEY-PIECE OF MAJOLICA TILES IN STONE.——*Executed by Messrs. Maw & Co., for the International Exhibition.*

	Areas in acres.
1. Swift's-lane	330
2. Bitt's-bank	50
3. Castle-mill	170
4. Dow-beck and Milbourn	750
5. Paddon-beck and Newtown	630
Total area in statute acres	1,930

The surface was most carefully considered, and all available means were used to prevent damage or inconvenience from local storms and flood-waters. The main sewers and secondary branches are built of bricks, moulded to the sectional form required for each sewer, and set in engine-ground hydraulic mortar.

Cast-iron pipes were used in crossing under rivers and watercourses and for the main low-water outlet. The means of flushing from surface waters are full and ample. Flushing-valves or sluices are provided on the Caldew, the Eden, Mill-beck, &c., and from a flushing-chamber in English-street (the highest part of the city), the sewers in twenty-eight streets in every direction may be flushed.

The sewers are designed to remove all sewage refuse without pumping. This will be accomplished completely at all ordinary times. An extraordinary flood may block the outlet; and a long-continued rain may then, for a short time, fill the lower sewers, simply because the surface waters impede all action: at such time the largest sewers would be filled; and, for a time, their delivery would be impeded. There have been as heavy floods in the district since the completion of the works as any previously recorded, causing no injury to the sewers. There has been local flooding, but no one blames the sewers as the cause.

The following are details of expenditure:—

Brick Sewers.

Size of Sewer.	Length in yards.	Average cost per yard.	£. s. d.	£. s. d.
ft.in. ft.in.		s. d.		
3 9 by 2 6	2,285	29 1½	3,326 19 10	
3 4½ „ 2 3	1,993½	24 8	2,455 6 8	
3 0 „ 2 0	1,385⅔	21 6	1,491 16 2	
2 3 „ 1 6	3,209	16 6	2,644 0 11	
Total length of brick sewers ..	8,873			
Cost	....	.....	.....	9,918 3 7

Earthenware Pipe Sewers.

ft. in.	Yards.	Cost. s. d.	£. s. d.	£. s. d.
1 6	646	9 7	310 2 4	
1 3	4,352	8 5½	1,842 6 4	
1 0	6,509	6 8	2,167 11 9	
0 9	2,509	4 10	608 18 0	
0 6	168	3 10	32 4 0	
Total length of earthenware pipe sewers....	14,184			
Cost	....	.....	.....	4,961 2 5

Cast-iron Sewers.

ft. in.	Yards.	Cost. s. d.	£. s. d.	£. s. d.
2 3	297	61 3½	910 3 2	
1 6	677	29 0	981 6 9	
1 0	48	18 2	43 10 9	
Total length of cast-iron sewers....	1,022			
Cost	....	.....	.....	1,935 0 8
				£16,814 6 8

Summary of Sewers.

	Length in yds.		£.	s.	d.
Brick sewers	8,873	Total cost....	9,918	3	7
Earthenware pipe sewers	14,184	Total cost....	4,961	2	5
Cast-iron sewers ..	1,022	Total cost....	1,935	0	8
Total length..	24,079		£16,814	6	8

Manholes.

	No.	Average cost. £. s. d.	£. s. d.	£. s. d.
On brick sewers	67	21 4 7	1,422 7 7	
On earthenware sewers	60	7 1 1½	423 8 0	
On cast-iron sewers.....	4	9 1 11	36 7 8	
Total manholes	131			
Cost	..	.....	.....	£1,882 3 3

Lampholes.

	No.	Average cost. £ s. d.	£ s. d.	£. s. d.
On brick sewers	18	1 14 6½	31 1 9	
On earthenware sewers.....	79	1 17 11½	149 18 6	
On cast-iron sewers.....	2	3 5 3	6 10 6	
Total lampholes	99			
Cost	..	.....	.....	187 10 9
Gullies.....	366	2 19 0	.....	1,086 2 0
Flood outlets				445 16 9½
Flushing valves and sluices				341 14 6
Crossing rivers, and sundry expenses				747 3 7½
				£21,504 17 7
Engineer-in-chief				1,150 0 0
H. McKie, resident surveyor, and inspectors of brickwork, &c.				505 9 0
Incidental charges, say				150 0 0
				£23,310 6 7

Rateable value £60,378 7 9 } Annual rate in the pound required to repay principal & interest in 30 years, 6d.
No. of houses, about 6,838 }

The cost of draining "self-contained" houses, including one watercloset, was about	£6 2 1
The same, without a watercloset, about	5 6 4
The cost of draining "tenement houses," with the watercloset for each house, taking on an average of 71 tenements, was, per tenement	1 6 7
The cost of draining "tenement houses" without waterclosets, taken on an average of 66 tenements, was, per tenement.....	1 10 0

Where a watercloset has not been used, a cesspit has been drained, and the drain is laid at a greater depth, involving larger cost. Where a water-closet has been used, the cesspit has been filled up.

All cesspits should be abolished, as nuisances, which draining only ameliorates, but does not cure.*

DECORATION AT ALNWICK CASTLE.—Herr Gotzenberg, a German artist, is at present engaged in making drawings of Chevy Chase, and other historic achievements of the House of Percy, for the Guard Chamber. We understand the commission was offered to Mr. Dyce in the first instance, who, from other engagements, declined it.

* To be continued.

CHIMNEY-PIECE CONSTRUCTED OF MAJOLICA TILES SET IN MANSFIELD STONE.

THE chimney-piece here represented has been executed by Messrs. Maw & Co. for the International Exhibition, and will form one of the principal features in a court in which a comprehensive collection of the clay manufactures of the Shropshire coal-field will be arranged under the superintendence of Mr. George Maw. It has been executed from the design of Mr. M. D. Wyatt, with the object of showing the general applicability of majolica or enamelled tiles for the purpose of inlaying stone as a means of architectural enrichment, both externally and internally; as well as for the simple covering of plain surfaces in dados, string-courses, friezes, &c., for which they are more commonly employed. It is impossible in an engraving to give a correct idea of the general effect of this chimney-piece, not only on account of the absence of colour, but because our engraving shows, of course, but one point of view. In this view the shape of the opening is not wholly satisfactory.

Messrs. Maw & Co. have introduced a variety of brilliant shades of purple, scarlet, rose colour, &c., into these and their other majolica tiles, which have not before been obtained in that material. Altogether, they comprise a large and varied selection of colours, the result of a long and careful study of this difficult and beautiful art.

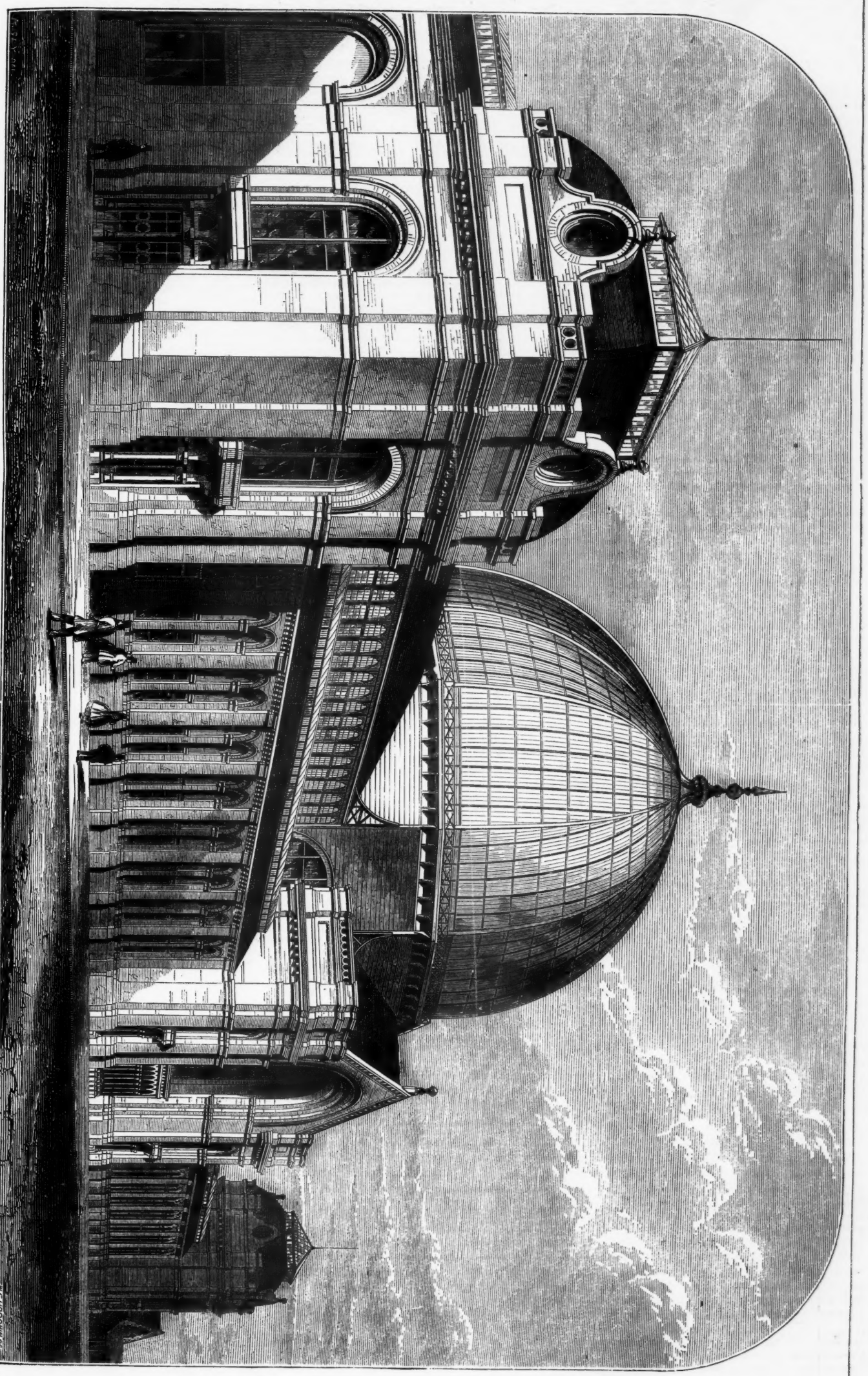
The means of fixing these tiles on the reveals of fire-places and other positions in which they are exposed to heat are provided; which prevent the possibility of their becoming detached by the fire, and, at the same time, improve the effect. The value of this fire-place, we understand, is about 125 guineas.

VENTILATION AND WARMING OF DWELLINGS.

A PLAN for supplying a constant current of warm air to domestic dwellings, public buildings, or conservatories, has been advertised by Mr. Joseph Newton, horticulturist. It appears that this adaptation of the ventilating principle has been tried with perfect success in several private mansions; and, from its comparative cheapness, it can be applied to small houses and cottages where the common fire-place may give a supply.

That anything wholly novel in principle can be claimed by the originator of this new combination of manifold experiments can hardly be expected; but if, as is alleged, a steady supply of warm air in cold weather, and of cool atmosphere in summer heat, can be obtained with certitude; then Mr. Newton's plan will be of great public value.

In cold climates, a system of regularly supplying a genial temperature, without expensive consumption of fuel, is a desideratum long sought for.



THE INTERNATIONAL EXHIBITION BUILDING: EAST FRONT.—*Designed by Captain Fowke.*

THE INTERNATIONAL EXHIBITION.

EXTERNALLY the building has now taken the shape it will on the present occasion retain; and internally the works are going forward rapidly towards completion. Much will have to be done after the 1st of May, and some of the best English works, we have reason to believe, will not be in the building by that date. Nevertheless, for all the purposes of the opening, quite enough will be done to support our character for punctuality and correctness. The English exhibitors are now sending in their cases, and the foundations for trophies are being constructed. The scaffolding has been removed from the upper part of the domes; and we are disposed to think, from the partial glance obtainable, that the coloured decorations of the domes will be found very successful,—more so, we should say, than those of the nave; which, nevertheless, give a sufficiently bright and agreeable aspect. The decorations of the transepts include inscriptions in large letters at the ends, under the semicircular lines of the roof-principals. Those in the English part are in the vernacular, and those in the foreign part are in Latin; thus we have at the south end of the east transept "Each climate needs what other climes produce;" and at the north end of the west taansept "*Domini est terra et plenitudo ejus.*" We must give up hope of any particularly striking effect,—any such effect, for example, as the long lines and the aerial lightness of the old Crystal Palace afforded. One of the most striking views probably will be obtained from the southern end of the western transept, which may take in the whole extent of the annexe, unless this be unwisely cut off, as has been done in other parts. The outer inclosure of the annexe, by the way, has gone over some few inches out of upright; but this need not lead to any serious inconvenience.

We have engraved a view of the eastern front of the building, from a photograph. It is fair to say that the outline of the dome, as seen from some other points of view, is more agreeable than in this. Prominent blots on this side of the structure are seen to be the meanness of the wooden tambour of the dome, the inartistic manner in which the brick entrance is connected with it, and the ranges of blanks with windows at the bottom. We have been reproved by lay writers for not "speaking out" on the subject of the ugliness of the building, and denouncing this and denouncing that. They ought to know that long ago we pointed out that the building would be very ugly and that the commissioners had acted unwisely, not to say unjustly, in ignoring the architectural profession. Beyond this we have no occasion now to go. We have the success of the undertaking most warmly at heart, and should be unwilling to assist in raising any inimical feeling. We would rather do all in our power to lessen the difficulties in the way of those who have to conduct it to a satisfactory conclusion.

Some of our readers appear to be misinformed as to the cost of the building; and it may be useful to repeat the terms of the arrangement with Messrs. Kelk & Lucas. The commissioners are to pay them 200,000*l.* as absolute rent for the use and occupation of the building: if the receipts reach 400,000*l.*, then the contractors are to receive all beyond that sum up to 500,000*l.* (or 100,000*l.* more); and the centre acre of the permanent building in the Cromwell-road is to be given up to the Society of Arts; the contractors removing and selling the remainder. Should, however, the receipts enable the commissioners to pay them 130,000*l.* in addition, or 430,000*l.* altogether, they are then to surrender the whole structure.

It seems tolerably certain that her Majesty will issue a Royal Commission to the Duke of Cambridge, the Archbishop of Canterbury, the Lord Chancellor, Lord Derby, and Viscount Palmerston, empowering them to open the International Exhibition in her name, and to invite foreign sovereigns to be present at the ceremony.

The hanging of the British pictures, which occupy the eastern portion of the permanent building, in Cromwell-road, is being fast proceeded with. The walls of the galleries are coloured sage green; the cove of the ceiling being ornamented with Venetian red lines and buff. There is reason to hope that the lighting will prove good; but unfortunately the appearance of the roof of the galleries is very unsatisfactory within.

The works for improving the approach by the Brompton-road are going on vigorously; and it is to be hoped that the committee will be so far aided, both by the public, with money, and the owners and tenants on the line, with good will and co-operation, that they may be able to make the improvement complete. We are anxious to see a beginning in Queen's-buildings, where the open space in front of the houses, which should be thrown into the road and path, is transformed into a public nuisance, especially on Saturday evenings. Amongst the improvements which could easily be made, but for the captious objection of a few individuals, is the much-needed way through Brompton-square. Mr. Robinson, the owner of a plot of ground at the north end of the square has offered to surrender it gratuitously to the public for that purpose; but at present the objections of occupants of houses at Prince's Gate stand in the way. It is much to be hoped that these will be removed.

We are requested to insert the following statement as to

The Battle of the Domes.

Some time ago a paragraph appeared in a weekly newspaper respecting the progress of the Great Exhibition, containing statements on the subject of the battle then raging between the contractors for the east and west domes, which, if left unanswered, may tend to mislead the public as to the amount of activity and skill displayed by each contending party. As the battle has now been fought, and the victory won by the eastern dome contractors, we consider this a fitting opportunity to put the public right on the subject, and to correct a few errors that have arisen. The construction of the two domes, and the whole of the roofing of the courts, was intrusted to the Thames Ironwork and Ship-building Company; the making and erection being placed under the superintendence of Mr. T. E. Hussey, an engineer of experience. He selected Mr. J. Mauldin (one of the sub-contractors for the erection of the transept and two towers of the Crystal Palace, under the inspection of Mr. Cochrane), to whom the erection of the two domes and the roofing of the courts were sublet. Mauldin hoisted the first column of the eastern dome on Monday, October the 21st, 1861; the first column of the western dome, Wednesday, November 13th, 1861; making three weeks and two days between the start of the two domes. Messrs. Kelk and Lucas then offered their assistance in erecting the western dome, which was accepted. From this time commenced the battle of the domes.

The western staff showed great spirit in putting up large wooden ribs, of which the eastern staff could not see the utility. This staff still kept their steady and safe course, while the western tried all they could to overtake them by employing nearly one third more men, and working till a late hour in the night, with the assistance of gas, the eastern men leaving work at the end of the day. The number of derricks rigged for hoisting and fixing the ground ribs for the eastern dome were nineteen. The whole of the main ribs of the eastern dome were hoisted and fixed by thirteen pairs of shear legs and thirteen derricks. The number of derricks rigged for hoisting the ground ribs in the western dome was twenty-eight. The number of shear legs for hoisting the main ribs was thirteen pairs, and twenty-six derricks: although this extra tackle and number of men were employed, yet they could not gain on the eastern dome. When the western found they could not gain the advantage they left off their nightly labour, and followed the eastern at a greater distance than when they started. The cost of labour for erecting the western dome is over 1,000*l.* sterling more than the cost of the eastern. There still is an extra cost for tackling.

Great credit is due to Messrs. Frost & Co. for recommending the rope for hoisting the ironwork: better could not have been made. The only tackle that gave way was the shafts of the steam-winches. Mr. Frost being present at the time one broke, suggested a plan to prevent it, which was adopted, and has been quite successful; neither of the shafts have given way since. Similar hoisting power was used in the erection of the two towers of the Crystal Palace, Sydenham, but to a greater advantage, as double the weight of iron was hoisted in less time than on the domes; so that the lift is not a new invention.

The break used for the dead stopping of the hoist, in case of danger, was invented, made, and fixed by J. Mauldin, for hoisting the ironwork for the towers at Sydenham. The large timber scaffolds erected for fixing the dome, were made under the direction and superintendence of Mr. Clemence. The erection of the eastern scaffold was sublet to Messrs. Fordham & Dean; the western to Messrs. Ransome & Last—men well experienced in such work. These are the two largest scaffoldings ever put up in so short a time. The whole of the cast-iron columns and girders for the galleries, and castings for the other works in the building, were erected under the superintendence of Mr. Ashton; the plans for the main bracing being supplied by Messrs. Ordish & Lefevre, engineers, of Great George-street. The plans for the dome scaffolds were supplied by Mr. T. E. Hussey: these are now being lowered; the eastern by its erectors; the western by Mr. Ashton; Messrs. Ransome & Last being engaged in another part of the building. The iron roofs of the long range of picture galleries, and the trussing of the galleries, were made at Messrs. Kelk and Lucas's, under the superintendence of Mr. Robert Hearn.

THE FOREMEN OF THE EXHIBITION.

THE ALBERT MEMORIALS.

The National Memorial.—At a recent meeting of the Queen's Committee it was stated that as yet no stone has appeared more suitable than the Argyll block at Mull; that the block is now cleared to a length of 115 feet; or 8 feet or 10 feet longer than it was supposed to be; and that practical men are of opinion that the stone is sound. A fragment is about to be polished in London. A granite block, 100 feet long and nearly 50 feet broad, has been found at Balmoral; but the colour is not so agreeable as that of the Mull granite, while the cost would be far greater for transit. These particulars, at all events, show that our suggestion at the outset, and before a monolith had been decided on, that, should the monument assume that form, it ought to be one of our own exclusive formation, and excelling all others in height, is likely to be capable of being realized. The amount subscribed is now 42,300*l.* Very much more will be required. Endeavours are about to be made to enable the working classes to co-operate.

Chapel Royal, Windsor.—We understand that Mr. Scott has prepared a design for a memorial window to his late Royal Highness, which is about to be laid before the Dean and Canons of Windsor for approval, previous to its being carried out in the window over the altar of St. George's Chapel.

Oxford.—At a recent meeting of the City Council, the mayor read a letter which he had received from the Lord Mayor of London, relative to the proposed national memorial to the late Prince Consort; and stated that he had replied to it to the effect that the citizens of Oxford preferred having a memorial of their own, and intended to place in the New University Museum a statue of Prince Albert. The mayor also stated that Mr. Woolnoth, the sculptor, had been engaged to supply the statue, at a cost of 300*l.*; towards which sum 200*l.* had already been raised.

Ipswich.—A densely thronged county meeting has been held in the council chamber of the Town Hall, Ipswich, under the presidency of the Earl of Stradbroke, lord lieutenant of the county, on a requisition signed by more than 800 persons, in order to consider the subject of a memorial of the Prince. It was resolved, at this meeting, "that a county memorial be raised in honour of his late Royal Highness the Prince Consort, and that a college for the scientific and practical instruction of the middle classes at a moderate cost would well accord with the views of the illustrious Prince, and would be of permanent benefit to the county." Upwards of 6,000*l.* were subscribed on the spot.

Faversham.—Here, as elsewhere, much difference of opinion prevails on the question between a local and the central memorial. Amongst the many irrelevant and even absurd suggestions as to "useful" memorials made throughout the country, Faversham seems to have been distinguished by the most pre-eminently ridiculous one,—namely, that an "Albert Pump" should be erected in the market-place. It has been resolved, however, to collect subscriptions in the mean time, and afterwards to decide as to what shall be done with the proceeds.

Bristol.—There was a large attendance at the Guildhall, Broad-street, on the 20th of March, convened by the mayor, to confer with him as to a suitable memorial of the Prince, when resolutions were passed, including one approving of subscriptions being raised for some suitable monument, but without more particularly deciding on the nature or locale of the memorial. The mayor spoke of a bronze statue, and a monolith was also suggested.

Edinburgh.—At a meeting of the General or Central Committee for promoting the Scottish National Memorial, a chairman and other office-bearers were elected, and an acting committee appointed (with power to add to their number), to take means, as soon as the amount of funds could be approximately estimated, for ascertaining the personal wishes of Her Majesty as to the nature, the site, and the execution of the memorial; and to report as to the best mode of carrying Her Majesty's wishes into effect. There was a numerous and highly-influential meeting, including the Duke of Buccleuch (who presided), the Duke of Athole, the Earl of Rosslyn, the Earl of Haddington, Lord Dunfermline, the Lord Provost of Edinburgh, and many others. The only county subscription as yet sent in, as a separate contribution, is that from Argyle, which amounts to 460*l.* Argyle is a county very thinly inhabited.

Glasgow.—It has been proposed by Mr. G P. Kennedy that the Glasgow memorial of the Prince Consort should be a cenotaph in the West-end Park; and he has prepared plans of such a building; containing an area of about 300 square yards, with façades of 52 feet each, and 115 feet in height to the top of the pinnacle. The proposed building is meant as a "repository for works of art, science, and manufacture, as well as being an honorary tomb;" and Mr. Kennedy adds that "such a spacious interior, with its smaller compartments, might be converted into a library or reading-room, and might be useful as a protection from the inclemency of the weather." The estimated cost is 5,240*l.*

Fettercairn.—At a very influential meeting here, it has been resolved to have a local memorial; the nature of it to depend on the sum subscribed. We must here protest against an absurd expression, which appears to be getting into use both in

England and Scotland (we have even seen it in a London newspaper), and which occurred at Fettercairn, where her Majesty was alluded to as "our gracious Majesty."

Dublin.—A highly influential meeting has been held at the Mansion House, Dublin, upon the invitation of the Lord Mayor, to inaugurate the movement for the erection in this city of an Irish memorial of the Prince Consort. The *Freeman* says:—"From the very successful beginning which has been made there can be little doubt that the 'memorial' will be worthy of the many claims which Prince Albert's memory has upon all classes, especially those engaged in science, the arts, and in commercial and industrial pursuits. The very handsome sum of 1,200*l.* was subscribed even before the meeting; and, if the subscriptions come in, as there is every reason to believe they will, with the same liberality and rapidity, a large sum will soon be realized. There will be a meeting of the committee of the county Dublin subscribers. They will be specially convened by the lieutenant of the county, the Earl of Howth, to consider the propriety of sending their subscriptions to the Irish instead of to the London fund. The county subscriptions, we understand, already reach the sum of 500*l.*, which will at least be doubled before the county lists are closed."

MR. PEABODY AND THE LONDON POOR.

MR. GEO. PEABODY, the American banker, has given a formal shape to his intention, already mentioned by us, of conveying to trustees 150,000*l.* to be applied "exclusively to such purposes as may be calculated directly to ameliorate the condition and augment the comforts of the poor who, either by birth or established residence, form a recognized portion of the population of London." He stipulates that "now and for all time there shall be a rigid exclusion from the management of this fund of any influences calculated to impart to it a character either sectarian as regards religion or exclusive in relation to local or party politics;" and says, "thirdly, in conformity with the foregoing conditions, it is my wish and intention that the sole qualifications for a participation in the benefits of this fund shall be an ascertained and continued condition of life such as brings the individual within the description (in the ordinary sense of the word) of 'the poor' of London, combined with moral character and good conduct as a member of society. It must, therefore, be held to be a violation of my intentions if any duly qualified and deserving claimant were to be excluded either on the grounds of religious belief or of political bias."

With the highest consideration for the motives of the benevolent donor, we must confess to strong misgivings as to the result of the donation. It sounds very much like offering a premium for hereditary and continuing poverty; and if this view be carried out, it will do an enormous amount of evil instead of good.

Mr. Peabody points out the probable desirability of applying "the fund, or a portion of it, in the construction of such improved dwellings for the poor as may combine in the utmost possible degree the essentials of healthfulness, comfort, social enjoyment, and economy;" and names the United States' Minister in London, Lord Stanley, Sir Emerson Tennent, Mr. C. M. Lampson, and Mr. J. S. Morgan, as trustees for the application of the fund, with power to add to their number. Before the words of the trust deed are settled, good counsel should be taken.

PARIS.

A FEW steps from the Boulevart de Sebastopol (*Rive droite*) a house is being constructed which will cause the disappearance of the last vestiges of one of the most ancient thoroughfares of this old quarter,—that of the Rue de la Vieille Monnaie. This street, whose origin *se perd dans les nuits du Moyen age*, was known, before the time of St. Louis, by the name of Rue de la Monnaie. A little higher up, on the Boulevart de Sebastopol, at the angle of the Rue Rambuteau, there remains also the last house of another old street: there commenced the Rue Salle-au-Comte. The Comte de Daumartin lived there; his hotel having been, some time afterwards, the abode of the Chancellor de Marie, who was massacred in 1418 by the Bourguignons when Paris was given up to the populace by Perinet Leclerc.

The belfry erected between the Mairie of the first arrondissement and the church of Saint Germain l'Auxerrois is completed, with the exception of the placing of the clock. The open space extending in front of this façade of the Louvre is completed; but not after the original design of Perrault; who proposed thereby to open an immense square between the colonnade and the Pont-Neuf; so that the demolition of the church of Saint Germain-l'Auxerrois and the adjoining block of houses would have followed.

In order to disengage the side of the Louvre in the direction of the river, Louis XIV. proposed the erection of a monumental bridge opposite the Lesdiguières pavilion. This bridge was to have terminated at the other side of the Seine, in a semicircular open space, whence three boulevarts were to radiate; viz., one to the south-west, towards the esplanade of the Invalides; another to the south-east to the Luxembourg; and a third straight to the south, joining into the road to Versailles.

The works of the Billancourt bridge, commenced in the month of September last, have been suspended, owing to the flood of water in the river. The structure is to be composed of two sections, united by an island; viz., three arches over the large branch of the Seine, and two over the others; in all five arches. The Billancourt bridge will afford ample means of communication with Boulogne and other suburbs on the right bank of the Seine, where the population is continually increasing, and desirous of communication with the communes of Issy and Bas-Meudon, so rich in materials of construction of all sorts. Above Billancourt the Seine is to be crossed by another bridge, a girder one, to carry the *chemin de fer de ceinture*, and for foot passengers. The execution has been ordered, and all steps taken for its construction.

THE ARCHITECTURAL EXHIBITION.

THE annual exhibition was inaugurated on Tuesday evening last, by a numerously attended *conversazione*, at the house in Conduit-street.

The galleries of the building were thrown open and brilliantly illuminated, while the walls and screens were covered with drawings, photographs, and sketches of architectural subjects.

Additional interest was imparted to the exhibition by the collection of original sketches and designs of the late A. Welby Pugin, the former taken in the principal cities of France, South Germany, Belgium, and Italy. These were exhibited by themselves in the west gallery.

The chair was taken by the Rev. R. Burgess, rector of Chelsea.

Mr. Edmeston (hon. secretary) said, that in the absence of their excellent treasurer, Mr. Ashpitel, he wished to make a few remarks in reference to the position of the undertaking. He was glad to be able to announce that the receipts during the last year had been sufficient to meet the expenditure. This, he believed, was partly owing to some new regulations, including the payment of the carriage of drawings sent from the country; thus affording architects in the provinces every opportunity for the display of their works. With regard to the present exhibition, he referred with pleasure to the Welby Pugin collection exhibited in the western gallery. Having been informed that Mr. Pugin was taking steps to exhibit the drawings of his eminent father, they had communicated with that gentlemen, who had consented to place them in the gallery, so as to avoid the cotemporaneous opening of two architectural exhibitions. The Pugin drawings might be viewed separately, at a charge of 1s.; but the subscribers to the society and season-ticket holders would be enabled to see them without further charge. He was sure that the public would avail themselves of the opportunity now afforded to them to improve their taste in architectural matters. The utility of such exhibitions as a mode of instructing and improving the public taste in architecture was obvious; and the necessity of some such improvement was equally clear; for all who had witnessed a certain great undertaking in the neighbourhood of the metropolis must admit the necessity of devoting greater attention to this important subject.

The chairman said he had been requested, without any previous notice, to take the chair on the present occasion; and that he presumed he would be expected to say something upon a subject as to which he was very ignorant. He had been connected with the institution for some years; and he confessed that he took great interest in the object which it was intended to promote. He highly approved of the liberal arrangement which the committee had made with regard to the admission of visitors and subscribers; and he believed that if the commissioners of the great International Exhibition were animated by a similar spirit, they would find their season-tickets going off at a more rapid rate. Exhibitions were now the order of the day; and it was impossible to overrate their importance as a means of instruction to those who, although, perhaps, not professionally engaged in works of construction, were at the same time desirous of improving their taste. Neither could it be denied that there was great scope for improving the architecture of the metropolis. But whatever shortcomings might be instanced in this respect, he believed that the fault lay not with the architects as a body, but with those who had the control of the public money. He had always been of opinion that it was a pity, when Parliament voted public money, some means was not adopted to insure the due preponderance of taste as well as utility. If, however, Parliament would be a little more liberal in the encouragement of architectural art, the metropolis would soon bear testimony to the improved tone of the Legislature in that regard. The rev. chairman then referred to the death of the late Prince Consort; and, having stated how much the world of art was indebted to him; he said that an architect of great eminence, whose studio had been frequently visited by the Prince, had assured him that he had never known a person who had so fine a taste or so correct a judgment with respect to sculpture.

On the motion of Professor Kerr, a vote of thanks was passed to the chairman for presiding.

The exhibition includes 343 designs and drawings, and 34 specimens of materials and inventions relating to buildings. In the latter department some prominent objects exhibited on a previous occasion have been left in their old position, and give the collection an aspect of staleness. The great feature of the exhibition is the remarkable collection of designs, drawings, and sketches, 700 or 800 in number, made by the late A. W. Pugin. When it is known that in addition to the inspection of these and the general collection at any time, the half-crown season-ticket admits to the following promising set of lectures,—(May 6th), On the transport and erection of Obelisks, and other large Monoliths, in Ancient and Modern Times, by Professor Donaldson; (13th), The Character and Career of the late A. W. Pugin, by Professor Kerr; (20th), Pagan Architecture, by Mr. W. Burges; (27th), Conventionality in Ornament, by Mr. J. P. Seddon; and (June 3rd), The Truthful in Art, by Mr. R. W. Edis;—the number sold ought to be very large.

The exhibition will remain open from the present time until the 30th of June next.

MANCHESTER ARCHITECTURAL ASSOCIATION.

A MEETING of this association was held at the Rooms, George-street, on the evening of Wednesday, March 19th, when Mr. R. W. Aitken read a paper on "Botany in Relation to Architectural Design." In the course of the paper the writer remarked:—Nature, as the model and source of architectural decoration, does not necessarily imply exact reproduction. Architectural style will not admit of this faithful copying; for, in proportion to the spirit of the style must be the character of the ornament; the greater extent of artificiality requiring corresponding conventionality. The writer reviewed the characteristics of the various leading styles in connexion with their relative possession of the attributes of "fitness," "simplicity," beauty, and expression; and, in referring to the primal sources of all decoration, viz., utility and beauty, remarked that,—The developement of utility, as first in order, was natural; inasmuch as it is especially connected with man's physical being; beauty with his intellectual: utility was necessary to his life as a creature; beauty to his existence as a human being.

Having secured his physical comfort by the erection of a shelter from the external elements; and thereby developing utility in construction; he would not rest contented till construction should elaborate itself in decoration, and his intellect receive thereby something to satisfy its wants.

A discussion ensued; in which, amongst other subjects, the use of conventionalism, in the adaptation of natural forms to decorative purposes, came under consideration.

GLASGOW ARCHITECTURAL SOCIETY.

AT a meeting of the Glasgow Architectural Society, held on the 17th, a paper was read by Mr. James Cousland, entitled "Remarks on Modern Church Architecture, with special reference to Plan, and the Adaptation of various Styles to suit its requirements." The reader said the problem to be considered was this:—Given the requirements of a Presbyterian church: how shall

we fully and completely meet them, and at the same time realize a perfect architectural composition? The solution may doubtless be arrived at in many ways; and it is the aim of the present paper to throw out a few thoughts towards this object. The requirements of a Presbyterian church are few and simple, possessing no ritual or liturgy. The sermon or exposition is the leading feature in her public worship: the great purpose to be served is, therefore, that an assembled congregation shall see and hear the preacher easily and with comfort. In fact, the interior of such a church should be practically an auditorium of the best construction: nothing more is absolutely necessary. With our simple forms of worship, the first thing which naturally suggests itself is, that the plan shall be so arranged that every one may, as far as possible, face the pulpit, and that there be no pillar or other obstruction to the view. Second, that the building should be expressive of a large and spacious interior; that externally some broad treatment or bold leading feature be introduced, to show plainly that it is not a building in stories nor divided into apartments. These points, successfully attained, would fulfil the conditions of fitness and expression of primary consequence in every essay at real and true architecture. Another quality desiderated, which is inseparably connected with those already mentioned, is that of truth. All the great features of the plan should proclaim their disposition and arrangement, and their relative importance, by the treatment of the masses and outline of the elevation.

TESTIMONIAL TO MR. CHARLES KEAN.

OUR SILVERSMITHS.

THE costly testimonial, subscribed for by the friends and admirers of Mr. Charles Kean, was presented to that gentleman in St. James's Hall, on Saturday last. The great room was full. The Chancellor of the Exchequer performed the office of presentation with properly appreciative words; and Mr. Kean replied at some length in an admirable speech admirably delivered. In the course of it he said,—"It has always been my earnest desire that the works of England's mighty dramatist should be presented to the world in a manner worthy of their innate beauty and grandeur; that each performance should represent truly 'the age and body of the time;' and where the architecture and costume should be alike portrayed either in their splendour or in their simplicity. By combining pictorial art with the finest poetry known to mankind; by assisting the delusion with regard to place and time; by holding up the mirror of history; I had hoped, without detracting from the power of the actor, or the importance of the author, to have rendered that stage over which I had control, something more than a mere vehicle of transient amusement;—an elevating and instructive recreation. If there be any who supposed that I intended to address myself merely to the eye, my purpose has been so far perfectly misunderstood; for I meant but to pass through that gateway of the mind, and appeal to the understanding of my audience."

The testimonial consists of nine pieces, in oxydised silver. The centre is a large vase (with singularly involved handles), presenting portrait models of Mr. and Mrs. C. Kean in the plays of "Lear," "Hamlet," "Henry IV.," "Winter's Tale," "King John," "Richard III." "Much ado," "Henry VIII." "Merchant of Venice," with figures of Shakspeare, and tragedy and comedy. Then come two candelabra for five lights, with portraits of Shakspeare in low relief; four dessert stands, bearing severally, on the base, a subject in low relief from Shakspeare's plays, and two silver groups; the first illustrative of "Midsummer Night's Dream;" the second of the "Tempest." The whole were designed and modelled by Mr. H. H. Armstead, and manufactured by Messrs. Hunt & Roskell.

The amount subscribed, if we understand rightly, was more than 2,000*l.* We regret that we cannot feel the same admiration for the works, in an artistic point of view, that has been expressed by our contemporaries; though some of the groups are very charmingly modelled and deserve praise. Want of the right appreciation of the capabilities of metal work is shown in the largeness, not to say coarseness, of the parts; which gives to them the aspect of cast-work. The foliage, for example, supporting the lights in the candelabra, is simply abominable. It may seem ungracious, in connexion with so interesting an event as we regard this presentation to be, to hint even at an objection to the way in which the wishes of the committee have been carried out; but in the interest of art-manufacture we are forced to speak. If we are to accept this costly testimonial (a magnificent commission) as the best that one of our best firms can execute, the art of the silversmith is not rising in England.

TELEGRAPHIC PROGRESS.

AN interesting report on the telegraphic communications established between the various police offices in the city of London has been printed by order of the authorities. From this report it appears that, when the system was resolved upon, it was considered best, if possible, to have the wires stretched between the various church towers; and permission was given by the authorities of all sects connected with the churches. The contract was given to Messrs. Reed, Brothers, telegraphic engineers; and completed, without delay, at a cost of less than 600*l.*; including not only instruments, but also an extra wire from the superintendent's residence to the chief office, for use during the night. The system comprises a separate wire from each police station in the City to the chief office. The whole line has now been at work for fifteen months; the men who happen to be on duty transmitting the messages themselves. The annual cost does not equal that of a single additional constable. Great facilities, as may be imagined, have resulted from this new police organization of the City; messages, which formerly required hours being now delivered in seconds: and reports, formerly made only once in twenty-four hours, being now superseded by hourly communications; while in cases of urgency, as at the great fire in Tooley-street, the police force can at any moment be concentrated on any one district of the City. The plan was originated and developed by Mr. Sydney H. Waterlow.

Throughout the city of Glasgow all the police-offices are now in communication by telegraph with each other, and also with the central fire-engine station; so that in case of fire in any district, information may at once be sent to the fire-engine office. The larger commercial firms are availing themselves extensively of the invention; about fifty sets of instruments being now in use in Glasgow; and in a week or two there will be in operation several hundred cables, containing from ten to thirty wires each.

An influential assemblage of gentlemen connected with the Atlantic Telegraph Company, or otherwise interested in telegraphic communication with America, have had an interview with Lord Palmerston as to the relaying of this telegraph. The Right Hon. Stuart Wortley, in stating the object of those with him, said that all the failures which had occurred hitherto had been in shallow water; and, out of twenty-four submarine telegraphs of different lengths, there were twenty-two at the present time in perfect order. The failure of the Atlantic cable, he said, arose from circumstances, connected with its manufacture and laying down, which subsequent experience had shown the projectors how to avoid. The depth of the sea was also now understood among men of science to be an advantage rather than otherwise. What the deputation wished his lordship in conjunction with her Majesty's Government to do was, to follow up the last partial success by sending a small expedition for the purpose of taking soundings along the proposed route between Ireland and the coast of Newfoundland; to give a favourable consideration to the overtures made by the American Government; and to guarantee, jointly with that Government, interest at 4 per cent. for thirty years, upon a capital of 700,000*l.*—equivalent to a guarantee of 28,000*l.* per annum for thirty years. In addition to this they should be glad if a commission were appointed to inquire into the whole subject of submarine telegraphs. Specimens of the cable used in the late attempt, and also of others, to show the great superiority in construction of the cable now proposed to be used, were then exhibited to his lordship, who carefully inspected them. His lordship observed that there was no question as to the value of telegraphic communication between this country and America; though he feared that unless backed by a Government guarantee the public would not be willing to subscribe their money to the undertaking. If a communication could be established the commercial intercourse would, doubtless, be enormous; and quite sufficient to pay a dividend without any assistance from the Government. He had heard the other day that the American Government had the notion of establishing telegraphic communication with Europe through Asia. After some further conversation Lord Palmerston requested that the chairman of the board of directors would forward to him an official statement embodying their proposal. His lordship also promised, on the part of the Government, that such statement should receive impartial consideration.

COMPETITIONS.

Painswick, Gloucestershire.—Designs having been submitted in competition for the proposed new cemetery, those by Messrs. Elmslie, Francy, & Haddon, architects, were selected as being the best and most suitable. The chapels, with porch and robing-room to each, are in the Decorated style, and are to be built of local stone, the roofs covered with Staffordshire tiles. Between the chapels is a tower and spire. The lodge, entrance-gates, boundary-walls, and palisading, are of appropriate character. The grounds are about 4 acres in extent, 2½ acres of which are allotted to the consecrated portion, and 1½ acre to the unconsecrated portion. Tenders for the whole of the works have been received, and that submitted by Mr. H. Birchall, of Birmingham, is accepted. The works are to be commenced immediately.

Dartmouth.—The Dartmouth town council have awarded their first premium to Mr. John Bell, engineer of the Dartmouth and Torbay Railway; and their second to Messrs. Hickes & Isaac, architects, of Bath, for plans for the improvement of their town.

THE INDUSTRIAL FARM WELL, BRIGHTON.

A GREAT event, in local estimation, has just occurred at Brighton. For the last four years a well has been in progress on the Warren Farm, on which the more youthful inmates of the Brighton workhouse, some 250 in number, are to be set to work in connexion with the Industrial Schools there. The farm is situate on the summit of the South Downs, some 370 feet above the level of the sea. When the contract was taken (by Mr. North) it was believed that a shaft of about 400 feet in depth and 6 feet in diameter would constitute the actual excavation. When the well, however, had been sunk to a depth of 437 feet 9 inches, there was still no water, and Mr. North threw up his contract. The guardians then took the work into their own hands, and had sunk the well to a depth of 1,282 feet, at a cost of about 100*l.* a week (or 6,500*l.* in all), when at last a strong body of fine soft water was reached on Saturday before last. The water on Monday had risen upwards of 700 feet in the shaft, which, however, had been diminished to a bore of 4 feet diameter, after sinking to a depth of 437 feet 9 inches, and cutting a horizontal chamber 421 feet 9 inches in length, from which the smaller shaft was sunk. The water, therefore, had nearly reached the head of the lower shaft.

The first intimation of the water having been reached was not understood. It consisted in the fact that "digging the well had ceased to make it any deeper:" in other words, the loose green sand had been forced up by the subjacent water in its rising as fast as that sand could be removed. The men were at last convinced of the winning of the water, and of their own imminent peril, by a loud report, and a rushing rumbling sound, soon followed by the actual rise of the water into view. The water rose 400 feet in a few hours, and continued to rise at the rate of 100 feet an hour.

The news was, of course, very welcome to the ratepayers as well as the guardians. The latter gentlemen deserve credit for their firmness in resisting the many attempts to dissuade them from proceeding farther with the work as it went on. Only the week previously the guardians had been advised to put a stop to such fruitless expenditure.

CHURCH-BUILDING NEWS.

Lowestoft.—The successful competitors for the erection of the New Wesleyan Chapel are as follows:—Bricklayer, Mr. George Rix, 792*l.*; carpenters, Messrs. Butcher & Blyth, 699*l.*; stonemason, Mr. Utting, 137*l.*; foundryman, Mr. B. H. Skoyle, 197*l.*; painter, Mr. J. W. Ling, 178*l.* The above sums leave out the odd shillings, and the total cost will be 2,004*l.* 4*s.*, exclusive of the site, which, with the buildings thereon, cost a further sum of 750*l.* The new building will adjoin the present one with a frontage to the High-street.

Iver.—The church for the newly-formed district of Iver Heath has been consecrated by the Bishop of Oxford. The church, which stands upon a site given by Mr. H. G. Sperling, lord of the manor of Iver, is in the Decorated style of

architecture. The architect was Mr. C. Reekes; and the builder, Mr. Fassnidge, of Uxbridge. It is built of flint and Bath-stone, and consists of a tower, nave, transept, and chancel, and will accommodate, including the children's gallery in the tower, about 300. The total cost of the building has been 2,400*l.* The seats are all open, formed of pitch-pine, and hand-polished. The church is dedicated to St. Margaret: it stands in an open country. Six stained-glass windows, the altar-cloth, &c., and the communion plate, were the gift of the ladies of the parish; the font being presented by the builder.

Abingdon.—The foundation-stone has been laid here of a New Independent Chapel. Messrs. Winterborne & Rowles are the builders, and Mr. J. S. Dodd, the architect. The cost of the edifice will be about 2,000*l.*

Itchen Abbas (*Hants*).—The new church at Itchen Abbas will be built mostly on the old foundation. Mr. W. Coles, the architect, who reported on the old church, recommended a rebuilding of the edifice; and his suggestion was adopted; Lord Ashburton, who is the patron of the living, giving a donation of 500*l.*, Lady Ashburton, 100*l.* The new church will be in the same style as the old one—Norman,—enlarged on the plan by the addition of north and south transepts. In the latter there will be a vestry and heating apparatus below the general level of the church, and over this a minstrel gallery. The chancel arch and two of the external arches will be worked in again, and a great portion of the open roof will also resume its duty. The seats will be open, and afford a total of 250 sittings. The roof externally will have only a simple bell turret projecting. Mr. C. Fielder, of Winchester, is the contractor; Messrs. Newman & Son executing the stonework. The contract is taken at 1,050*l.*

Stoke-sub-Hamdon (*Somerset*).—Mr. Ferrey, the architect, having, at the invitation of the incumbent, viewed the church at Stoke-sub-Hamdon, and made a careful examination of its various parts, states that in the course of his experience he has seldom met with a more interesting parish church; and that the greatest possible caution should be observed in renewing any of the ornamental features which have been ruthlessly cut away. There is nothing of a conjectural kind needing to be replaced. The chancel arch, remarks Mr. Ferrey, in a letter to the Rev. W. Greenslade, the incumbent, leaves clear traces of the ornaments which have been hacked away; and the missing members can be replaced without any doubt. Steps should be taken to remove the flat ceiling of the nave, and lay open and restore, where necessary, the fine old oak roof above. The unsightly gallery at the west end, blocking up half the fine reticulated west window, should be got rid of. Eventually, it is to be hoped, the chancel may undergo some improvements. The church ought, also, to be reseated with open benches corresponding to some of the ancient benches which still remain. The porch, with its groined chamber over the deeply-recessed Norman doorway, the groined tower, the screen, the south transept, the noble Norman chancel arch, together with other objects, are seldom to be found combined, as here, in one small building. The church is therefore deserving of a careful restoration. Mr. Ferrey recommends a special appeal in the diocese for raising the necessary funds to carry into effect the recommendations made.

Brecon.—It is intended to re-open the restored chancel and transept of the Priory Church on the 23rd of April, being Wednesday in Easter Week. The chancel of the church (which is of thirteenth century architecture) was choked up with monuments, and had some of its best features hidden by plaster and whitewash. The stone vaulting was originally designed, but never before executed.

Liverpool.—A discussion arose at the Burial Board last week, according to the local *Courier*, as to the buildings proposed to be erected at the principal entrances of the new parochial cemetery at Walton. Mr. Lacy, the architect, attended; and in conjunction with the committee examined the various plans. It was ultimately agreed that the suggestion for a clock-tower, having a lodge at each side, be approved, and that Mr. Lacy and Mr. Kemp decide as to the best site for the offices and superintendent's house.

Lozells (*Birmingham*).—The foundation-stone of the new Congregational Chapel at the Lozells has been laid. The building is to be erected in the Italian style, by Mr. W. Bennett, builder, Lozells, from the plans of Messrs. Poulton & Woodman, of Reading, architects. The chapel is to accommodate about 1,000 persons, and the cost of the building, according to the tender (as given by us on 22nd March), is 2,967*l.*

Durham.—The cathedral authorities are now taking the necessary steps for polishing the Weardale marble pillars, of which there are a large number, in the nine altars. Hitherto their beauty has been entirely obscured by the accumulation of lime and other materials with which they have been coated. A polishing-engine, on a new principle, made by Mr. Howson, engine-builder, has been erected. Mr. Robert Beale, of Newcastle, has accepted the contract, and has commenced the work of restoration.

BYZANTINE DECORATIVE COLOURING.

BYZANTINE decorative colouring was rich and warm. Gothic seems to me to be "flashy and gaudy," rather than warm. South Kensington appears to be duly orthodox and cold; very correct; neat; but no life; no warmth;—wholly different from twelfth-century work. Gothic windows and walls, inasmuch as colour is concerned, are all spoiled by eternal diapers, patterns, borders: there are no broad masses of colour, as in Byzantine work. I use the word Byzantine to mean all Christian art before Gothic. Gothic is finicky; Byzantine manly and massive. If Byzantine had only had the pointed arch it would have been perfect. There is life in it, and plenty of grotesque,—the best sign of healthy minds. I should like to see some South Kensington grotesque: it would be interesting. Perhaps the master at Leeds, who once answered one of my letters, will send us a sketch of what the School of Design considers grotesque. Gothic grotesque is sensual compared with the open-hearted vigour of Byzantine.

Gothic form and outline are pretty elegant outline. Byzantine cares not a fig for elegance: it is noble, thick, massive, manly in form; and life is given to the form by the glorious grotesque. This may be well studied in the metal-work and furniture of the two. A. W.

PUTTY.

HAVING seen a report in one of the daily papers that some of the glass in the dome of the Exhibition building had been blown out, I wish to call the attention of builders, or any one having glass to put in, to the kind of putty they use. There is now an immense quantity of putty made of pine oil and whiting that never dries; and if you lay a good coat of paint on it, in a short time you may lift the paint from the putty like a piece of tape. This kind of putty is made to sell cheaply, and can be bought at about two-thirds the price of the genuine article, made from linseed oil. The adulterated putty is much whiter than the genuine, and will stick to your fingers like bird-lime; and, after it has been kept a few weeks, will go gummy on the outside and make very bad work,—particularly so where it is used for sky-lights: good tough clay would answer for glazing in many instances better than the adulterated putty, which is a direct fraud on the consumer and owners of property. LEEDS.

THE PRESERVATION OF ICE.

HAVING recently paid some little attention to the methods adopted for the preservation of ice, I can bear testimony to the accuracy and value of the article which recently appeared in your paper on that subject.

I should, however, like to be allowed to direct attention to two precautions which it is desirable to observe; and which might, in arranging an ice-house, possibly escape notice.

The first is the necessity of *trapping* the drains by which the water which melts from the ice is carried away. If this be not done; and with a trap of such a nature as to be almost certain to remain full of water; the drain will act as an inlet of warm air, and will effectually counteract all the best precautions of other sorts. It has actually happened that the ice in a well-built ice-house, with untrapped drains, was found to waste away so rapidly as to render the house useless; and that, on carefully trapping the drains, the melting was entirely stopped.

The other precaution to be taken is that of providing against the enormous lateral pressure which, in ice-houses built above ground, the side-walls have to sustain. This pressure arises from the sliding of the small fragments of ice over one another; and it is principally to counteract it that the enormously thick walls mentioned in your paper are requisite. Thinner walls, with a lining of straw or saw-dust, or some such material, would probably suffice to resist all ordinary changes of temperature, especially if sheltered from the sun's rays.

One of the best, and by far the simplest, ice-house that I have seen, is the one at the Crystal Palace; and the walls of it are only a brick and a half thick; but then two-thirds of its whole height are below ground; an arrangement which greatly protects it, both from lateral yielding and from extensive changes of temperature.

T. R. S.

THE COLOURED PANELS: ARCHITECTURAL MUSEUM.

SIR,—As one of the competitors for prizes offered for coloured decorations by the Ecclesiological Society, will you allow me to make the following remarks in your journal?

The Society stated in their circular, that "each candidate is expected to treat the panel as forming a portion of an architectural composition, and not as a cabinet piece. The original is in stone."

I treated my panel on these principles, according to my ability at least. Inferring from the closing sentence that the idea of stone was not to be lost, I presumed in my innocence that the thing was not to be made a doll of. Strange enough, the prize was given to a cast coloured most profusely; being nearly covered with decoration and elaborate pencilling.

I do not presume to question the judgment as to treatment; but I do remonstrate on the decision as opposed to the published conditions.

These prizes are proclaimed as a stimulant to the mind of the "art workman;" but is it intended for the provincial workers, or only for the metropolitans? For compare the two bodies. I sent for a cast in order to compete: I was charged 5*s.* for the cast; 2*s.* for case; carriage both ways, 4*s.* 6*d*; costing me 11*s.* 6*d.*; whereas a man in town only pays 5*s.*, price of cast. He has a free ticket for a year to the Architectural Museum: so have I, but cannot use it.

Considering the apparent anxiety of the Society for the welfare of the "art workman," I looked for some analysis of the successful and unsuccessful competitions; showing, for the instruction of the people, what were the merits on which they succeeded, and why others failed; but there has been no sound. T. BOTTOMLEY.

SUBJECTS FOR MEDALS AND PRIZES, 1862.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE council will proceed, in January, 1863, to take into consideration the appropriation of the Royal Medal.

The Silver Medal of the Institute will be awarded to the author of the best essay on either of the following subjects:—

1st. The application of coloured bricks and terra-cotta to modern architecture.

2nd. The application of timber work in England, constructively and artistically, from the year 1400 to the present time.

3rd. On the stained glass of the twelfth and thirteenth centuries.

4th. On the use of concrete for vaults and roofing purposes.

The Silver Medal of the Institute, with five guineas, will be awarded for the best illustrations, geometrically drawn from actual measurement (*with dimensions figured*, both on the drawings showing the general arrangements, and on the details), together with descriptive particulars, of an abbey gateway, a bridge, or other mediæval building in the United Kingdom, hitherto unpublished in that manner.

The council suggest certain subjects.

Soane.

The Soane Medallion will be awarded for the best design, well illustrated by a sufficient number of drawings, for:—

A parochial church to contain 1,500 persons, and arranged for the Protestant worship, without any detached columns or piers, and so as to leave the sight and view clear and unobstructed throughout. The style may be either Italian or Mediæval.

The successful competitor, if he go abroad within three years after receiving the medallion, will be entitled to the sum of 50*l.* at the end of one year's absence, on sending satisfactory evidence of his progress and his studies.

The Prize offered by the President, Mr. Tite, M.P., F.R.S.,

Ten guineas, will be awarded to the author of the best set of architectural drawings, executed in the best manner, and in the Italian style of architecture, for public buildings adapted to modern wants, *e.g.* churches, town-halls, railway-stations, public offices, &c., in England.

Sir Francis E. Scott's Prize,

Ten guineas will be given to the author of the best set of drawings for a building of moderate dimensions, devoted to civic or domestic purposes, in accordance, throughout, with modern requirements, and designed in harmony with the style of architecture of the thirteenth or of the fourteenth century.

The subject of the design for the Students' Prize in Books for the year 1862 is:—

"A Drinking-Fountain."

Miscellanea.

SIR ROBERT CLIFTON'S BRIDGE OVER THE TRENT.—The plan of this structure, says the *Notts Guardian*, provides for every exigency which may arise from the flooding of the Trent. The incline at either side is erected on arches, which will arise from inverted arches, so that the impediment to the free passage of the water when it should rise above the usual level will be reduced considerably. The expense is estimated to be 24,000*l.* at the lowest. The Trent Navigation Company, it is stated, intend to oppose the passing of the Act, on the ground that the track for the horses under one of the large arches is not to be fenced in with iron railings.

THE PHŒNIX PARK, DUBLIN.—In reply to Sir E. Grogan, in the Commons, Sir R. Peel said the Irish Government had entered into a very agreeable plan for ornamenting the Phœnix Park; and certain arrangements were made for planting it with ornamental and other trees. The question, however, was still under the consideration of the Treasury.

THE THAMES EMBANKMENT BILL.—In moving last week for leave to bring in the Thames Embankment Bill, Mr. Cowper stated that the powers contemplated by the Bill would be committed to the Metropolitan Board, without any control or interference, except that the coal dues were at present in the hands of the Treasury. The Bill would empower the Treasury to pay the money to the Board; who, however, would be left free and unfettered in executing the purposes of the Act. The Bill was described as one for embanking the north side of the river Thames from Westminster Bridge, and for making new streets in and near thereto, and from Blackfriars Bridge to the Mansion House. After some discussion, leave was granted to bring in the Bill.

LIVERPOOL SOCIETY OF FINE ARTS.—The annual general meeting of the members of this society has been held in the public sales-room, Liverpool and London Chambers, for the purpose of receiving the report for the past year, and electing the council and officers for the ensuing year. Mr. Boult, the honorary secretary, read the report; which stated that, in the first season, 1858, the amount realized by the sales was 2,256*l.*; in the subsequent years as follows;—1859, 4,830*l.*; 1860, 4,096*l.*; 1861, 5,390*l.* Total for the three years, 14,316*l.* Average for the three years, 4,772*l.* The chairman, Mr. T. W. Rathbone, in closing the proceedings, alluded to the strong desire he had to effect an amalgamation between the Society of Fine Arts and the Liverpool Academy; expressed his regret that the proposal had not been carried into practice; and intimated that the Society of Fine Arts would at any time be prepared to accept, in the most cordial manner, any overtures for amalgamation which might be made by the Academy.

ENLARGEMENT OF THE GENERAL HOSPITAL, BIRMINGHAM.—At a quarterly board of guardians of this charity it has been resolved, on receiving a report from the new wing committee, that the whole question relating to the new wing be referred to the weekly board; and that the plans of the architect be carried into effect as speedily as circumstances will allow. The addition of the new wing will provide space for ninety-six additional beds; but a chief object is to improve the accommodation for the present number of patients. As to cost, the architect says,—"I have estimated the cost of executing the various works shown on the plans and referred to in this report, and find that they will cost about 7,000*l.* This will include all buildings, alteration of out-patients' department, ventilating, fixtures, hot and cold water supply, lavatory, bath, and waterclosets, fittings, and all other work necessary for the completion of the whole of the works in the best manner.

ASSESSMENT OF PUBLIC WASHHOUSES.—On the 20th instant an appeal was heard in the boardroom of the workhouse, Little Gray's-Inn-lane, against the heavy assessment of the Portpool-lane Washhouses, before Mr. J. Pownall and Mr. Goodhard, magistrates. Messrs. Hammond & Eiloart appeared on behalf of the Society for Improving the Condition of the Labouring Classes; and said that the society found it impossible to carry on the washhouses with their present loss; and in consequence of not being met in a fair spirit by the governors and directors they had resolved to close them on the 25th instant. For the last seven years there had been a deficit of 116*l.* per annum; the expenses being 517*l.*, and the receipts from 500 washers at 1d. per hour 411*l.* For this they were rated to the poor's rate at 420*l.* per annum. As regards the lodging-houses, there were tenements in the same street which were rated less in proportion than their own. Their houses, containing 116 rooms, had been rated equal to 3*l.* per room, while the other property mentioned had only been assessed equal to 2*l.* What they asked for was that the washhouses should be entirely relieved from rating, and the rate upon the lodging houses be reduced. Ultimately Mr. Pownall decided that the whole should be rated at 250*l.* He could not, however, agree to take the rating entirely off the washhouses; it being a bad precedent; and he should divide it by assessing the tenements at 220*l.*, and the washhouses at 30*l.*; and this on the understanding that, if the premises were converted to any other use, it would be liable to be altered to the real value.

RAGGED SCHOOL, BUCK'S-ROW, WHITECHAPEL. The Duke of Marlborough has laid the foundation-stone of the ragged school about to be erected in Buck's-row, Whitechapel. The schools, which will accommodate 480 children, are to be built by voluntary subscriptions; and about 1,000*l.* have been collected or promised. The entire cost of the building is estimated at 1,600*l.*; and the committee earnestly appeal to the public for contributions in order that the deficiency may be made up.

THE FONT IN BRIDEKIRK CHURCH. — At the monthly meeting of the Newcastle Society of Antiquaries last week, a short paper, by Mr. Monkhouse, was read on the font in Bridekirk Church. Mr. Monkhouse, after investigation, came to the conclusion that the carving was Old English, the language Old English, and that the inscription was carved by Richard, Lord of Bridekirk, on the font in Bridekirk Church, in the thirteenth century.

WOLVERHAMPTON SCHOOL OF ART.—Mr. Mückley, the head master of this school, having resigned his situation in consequence of his appointment to a similar office in the Manchester School of Art, a meeting of members of the council and students of the Wolverhampton institution was held for the purpose of presenting him with two testimonials on vellum,—one from the meeting, and another from the students,—in recognition of the ability he has manifested and the zeal and liberality he has shown since his connexion with that establishment. Several members of the council were present. Mr. Mückley, in acknowledging the compliments paid him, alluded to the bleak prospects of the school; but said that, although things did look rather dismal, yet results were before them which proved that the school had done a certain amount of work; and that the students were in possession of certain principles which, if fully developed, would tend to results beyond anything they might imagine or expect.

ARTISTS' BENEVOLENT FUND.—At the annual meeting in connexion with this fund, held at the Freemasons' Tavern, Great Queen-street, Lincoln's Inn-fields, the report of the committee of management stated that the ordinary income of the institution during the year had been 849*l.* 14s. 3d., and the extraordinary 389*l.* 7s.; which, with a balance of 287*l.* 11s. 3d., carried from the previous year's account, the proceeds of the annual dinner, and the interest on funded property, made the total income for the year 1,450*l.* 13s. The ordinary expenditure had been 1,062*l.* 14s. 1d., and the extraordinary 187*l.* 6s. 6d., which made the total expenditure for the year 1,250*l.* 0s. 7d., and left a balance in hand to be carried to next year's account of 200*l.* 12s. 5d. During the year a sum of 777*l.* 10s. had been distributed in the shape of relief to 52 widows of artists, and 76*l.* 5s. to 16 orphans; making the total amount distributed in relief, by the society, to the widows and orphans of British artists since its formation in 1810, 23,894*l.* 7s. 3d. The funded property in the Reduced Three per Cents. belonging to the society now amounts to 22,000*l.* Lord Ashburton, the president of the institution, will take the chair at the annual dinner in connexion with it on the 31st of May next.

ENTRANCE FROM PICCADILLY TO PARK-LANE. In the Commons, last week, Sir H. Verney asked the First Commissioner of Works whether, in consideration of the inconvenience and danger arising from the narrow entrance from Piccadilly to Park-lane, he would take measures to open the communication from Park-lane into Hamilton-place. Mr. Cowper said that this communication between Hamilton-place and Park-lane was recommended by a committee of the House of Commons in 1855, and was fully considered by the Government in 1856; but the difficulties were found to be such that no steps were taken. When Hamilton-place was laid out in 1809 it was intended to be a street without any thoroughfare; and those who now held from the crown leases of those houses had taken these leases on the understanding that that arrangement was still to continue. If a communication were to be made from Hamilton-place to Park-lane, it must pass not only through gardens which were now considered a portion of Hyde Park, but likewise through two gardens held on lease in connexion with the adjoining houses, which were let on terms that had now forty years to run. Under these circumstances, the Government were not prepared to take any steps. Hamilton-place was not of the width required for an important thoroughfare; as the distance between one area railing and another, at one extremity of the street, was not more than 38 feet of admeasurement. He thought the better way to improve the communication would be by widening Park-lane. Who is to do it?

SOMETHING LIKE VENTILATION.—The newsroom at Kilrush is so well ventilated that it takes two members to hold a paper, while a third, with a top-coat buttoned up to his chin, and a sou'wester lashed to his head with a piece of spun-yarn, reads it.

MEMORIAL OF JOHN LOCKE FOR TAUNTON SHIRE HALL.—Carrying out our often urged suggestion that busts and pictures of local worthies should be placed in vestry and town halls, and such like public places; a movement has been made at Taunton for placing a bust of John Locke, the metaphysician, who was a native of Somerset, in the Shire Hall at Taunton. A model has been prepared by Mr. E. G. Papworth; Roubiliac's bust being used as a groundwork. The result is said to be satisfactory.

LIVERPOOL ARCHITECTURAL SOCIETY. — On Wednesday evening, the 19th, the members of the Liverpool Architectural and Archæological Society held their twelfth meeting of the session, Mr. J. M. Hay presided. Mr. Parsons exhibited a model of a house near Woolton; and Mr. Weightman showed a specimen of slating for flat roofs and the sides of houses. Mr. H. P. Horner read a paper on "Sources of Architectural Effect;" showing the effect of light, form, colour, &c.; and recommending a study of the picturesque in architecture.

BRISTOL ACADEMY OF FINE ARTS' EXHIBITION AND GRAPHIC CONVERSAZIONE.—The seventeenth annual local display of paintings in water and oil has just been inaugurated. The company was not quite so large as on previous occasions. The three rooms opening from the grand vestibule (which was decorated with flowering shrubs and exotics) were devoted to the exhibition of the year; there being altogether nearly 430 pictures from local, London, and other artists. The peculiar exhibition of the Graphic Society, which consisted of water-colour sketches, chiefly by local artists, was on the basement floor, and much frequented during the evening.

ST. MARY'S, TAUNTON.—We learn from the local *Courier* that there is a pretty certain prospect that, by the month of August next, the tower of Taunton Saint Mary Magdalen will be complete in restored beauty. A proposal has been made by the vicar of St. Mary's, and we believe we may say with fair chance of success. The county of Somerset, second in loyalty to no county in England, has as yet entered into no plan for a combined memorial to the late Prince Consort. It is proposed that the inhabitants of the county should be invited to join in placing in the new tower a memorial window, to occupy the opening over the western door. We also find that a subscription has been set on foot for placing in the niches in the first story of the tower statues of the Apostles.

DISASTROUS CONFLAGRATIONS AT CAMPDEN HOUSE, KENSINGTON.—A fire has almost entirely destroyed the mansion known as Campden House, the property of Mr. W. F. Woolley, and situate in the Campden House-road, Kensington. The building contained thirty elegantly-furnished rooms, picture-galleries, and the private theatre in which the Campden amateur actors used to perform for charitable objects. The building was of the reign of Queen Elizabeth. Adjoining is another mansion, almost as large, termed the Elms, belonging to Mr. A. L. Egg, A.R.A., who, unfortunately, at the present time is away in Africa, on business. This building has also been considerably burned. The total loss at Campden House must be considerable; the furniture, mirrors, &c., being of costly description. As to the origin of the fire, not the least information could be obtained.

A BRICK-KILN A NUISANCE. — In an action brought before Justice Weightman, at Maidstone, a nursery gardener at Plumstead complained of a brick-kiln near his house and garden as a nuisance, injurious to his stock as well as to his household. Evidence being led, the judge left it to the jury, first, whether the burning of the kiln made the house of the plaintiff substantially less comfortable; secondly, whether it caused substantial injury to the plaintiff's garden. There was, no doubt, evidence of injury to both: no doubt the business of brickmaking was useful and necessary; but it must not be carried on so as to cause a serious injury to neighbours. Then it appeared that the kiln lay in a hollow, and within 20 feet of the plaintiff's house. There did not seem to have been any real injury to health; but it would be enough to sustain the action that there was substantial injury to the enjoyment either of house or garden. The jury answered both questions in the affirmative; which, of course, came to a verdict for the plaintiff.—Damages 20*l.*

ROYAL ITALIAN OPERA, COVENT-GARDEN.—Mr. Frederick Gye has issued his programme for the coming season, showing his determination to provide evidence for the foreign visitors we shall have amongst us of the pre-eminence of the Royal Italian Opera among all similar establishments. With all the old favourites, including Mdlle. Patti, Mdlle. Csillag, Signors Mario, Tamberlik, and Graziani, five new artists will make their first appearance in England. Donizetti's "Don Sebastien" will be produced, and Meyerbeer's "Robert the Devil" revived, with entirely new paraphernalia.

RAILWAY TRAFFIC RETURNS.—The traffic receipts of railways in the United Kingdom amounted, for the week ending March 8, on 10,109¼ miles, to 462,838*l.*; and for the corresponding week of last year, on 9,871¾ miles, to 485,272*l.*; showing an increase of 237½ miles, and a decrease of 22,434*l.* The falling off in the traffic of the past week, as compared with the corresponding period of 1861, is about twice as much in the goods and mineral traffic as in the passenger traffic of the great lines, caused by the depression of trade in the manufacturing districts. The traffic receipts in the second week in March show a decrease of 3,452*l.* as compared with those of the preceding week ending 1st March.

MONUMENTAL. — The monument which is about to be erected in Chichester Cathedral to the memory of the late Duke of Richmond has been executed by Mr. Gaffin, sculptor. It is surrounded by a carved medallion of his grace; and on the sides are the names of the various engagements in which he took part. The tablet is stated, in the inscription, to be erected by the officers and non-commissioned officers who served under him in the Royal Sussex Light Infantry Militia.——On Saturday last the memorial stone which has been placed on the west wall of the building at Scovell's (Cotton's) wharf, Tooley-street, London-bridge, near the spot where Mr. Braidwood met with his sad death, was uncovered in the presence of a large number of the police under Mr. Superintendent Branford.——A memorial to the memory of the late vicar of Misson, the Rev. W. Thorp, has just been placed in the churchyard at Misson. It is of Aberdeen granite, and consists of a base and shaft, with plinth, the whole inclosed by a palisading 6 feet by 9 feet.

THE BRIGHTON DRAINAGE.—The town council of Brighton having applied to the Home Secretary for a loan of money for the drainage of the town, in accordance with the surveyor's plan of carrying it out into the sea in front of the town, Mr. Ranger unexpectedly made his appearance at Brighton, and had interviews with the surveyor and other of the authorities, and with various gentlemen who have objected to the proposed mode of disposing of the sewage. Mr. Ranger expresses his determination to investigate and consider the whole subject minutely and thoroughly, as he is responsible to Government for the advice he may give as to the loan asked for; and on the whole he already appears to be unfavourably disposed towards the scheme in hand for carrying out the sewage into the sea in front of the town; and seems to consider that, in a popular watering-place such as Brighton, even prejudices ought to be cautiously dealt with, so as to avoid damaging the prosperity of the town. It is to be hoped that Mr. Ranger *will* advise the adoption of some better plan than the carrying of the sewage out into the sea in front of the town.

SITE OF ST. THOMAS'S HOSPITAL.—Mr. J. H. Elliott, a governor, writes,—Is it too late yet for all parties to make a rational settlement? Let the hospital remain where it is, and let the railway have all that is required. A portion given up to the railway, and the remainder (improved) left for the reception of patients, for the treatment of accidents, and of acute cases, and maybe for a medical school; and a sanitarium or an hospital, but in the country, for convalescents and for chronic sufferers. However unwise may have been the demands of the hospital, and however stern, under a sense of oppression, may be the railway; yet there is another large question involved, before whose grand claims all griefs and grievances should be put aside. Public bodies ought to know no jealousy, no single, personal, antagonistic interest to be struggled and fought for, inch by inch; but the public good should be liberally and disinterestedly consulted. In this respect a new railway, and especially one which traverses quite across London, and thus helps to relieve the dangerous and offensive congestion of London Bridge, Cheapside, or Holborn, is quite as much a sanitary institution, preserving and restoring health, as a hospital or a dispensary.

THE ARCHITECTURAL MUSEUM.—On Tuesday last, Mr. E. A. Freeman, M.A., delivered an address "On the difference between Minsters and Parish Churches." Mr. Beresford Hope, who presided, moved a vote of thanks to the lecturer, which was seconded by Mr. G. G. Scott. We may probably give an outline of the address hereafter.

THE ART-UNION OF LONDON.—The subscription lists will close on Monday night next: there is still time for such of our readers as desire it to send their guinea. Our advertising columns last week showed how many new works have been commissioned by the council, and how many advantages are offered to subscribers. Amongst other matters in course of preparation, a tazza from designs by Mr. John Leighton, commemorating the late Prince Consort as a patron of art, science, and literature, is now being produced for the Art-Union, and a number will be included as prizes in the next distribution.

INGENIOUS MODEL.—A man named Anderton, a labourer, residing at Bracebridge, has for many years been engaged on a model of Lincoln Cathedral in cork, which he intended obtaining space for in the Great Exhibition of 1862. The model is now complete, and is said to be an exact counterpart of the original. Upwards of a million of old corks have been used in the construction, each of which has been cut into a proper form with the aid of a knife alone. The length of the model is 10 feet 5 inches, width 7 feet 6 inches, and height 5 feet 9 inches. All the minutiæ of the original are faithfully copied; the figures on the west front and in the south-eastern entrance being, it is said, exceedingly well done. The interior has also been copied as faithfully as the exterior, even to the organ and the stained-glass windows.

UTILIZATION OF SEWAGE IN LIQUIDATION OF TAXATION.—The Select Committee of the House of Commons appointed to inquire into the best means of utilizing the sewage of cities and towns of England, with a view to the reduction of local taxation and the benefit of agriculture, having met for the first time, the Earl of Essex was examined. He stated that he had two hundred acres of land at Watford that he irrigated by sewage. He applied it chiefly to rye grass. He had also applied it experimentally to wheat, roots, and common grass, but more especially to rye grass, which gave him an increase in value of 2*l.* per acre clear profit. He irrigated two acres of wheat with from 60,000 to 80,000 gallons of sewage. Eighty thousand tons a year cost 1d. to 1½d. a ton, but it might in many cases be effected for ½d. He had found it most efficacious in destroying cutch and other weedy substances; and it had increased the production of corn to a most incredible degree. He had extensively applied the sewage to land, and in five minutes afterwards there was not the slightest smell therefrom. He had employed the same men to apply the sewage for years, and never knew them to suffer in health to the slightest degree. He used the sewage on land within 100 yards from his own house and found no annoyance from it. After another witness had been examined, the committee adjourned.

THE SINGULAR DISCOVERIES IN THE SWISS LAKES.—Recent discoveries show that at some primeval period a population of very considerable density lived in huts constructed on stages which rested on wooden supports driven into the bed of almost every Swiss lake, just as the Malays in Borneo and the Siamese in Bangkok may be seen living to this day. A wonderful number of articles pertaining to the daily life of those forgotten races have been brought to light. In some places the materials of the dwellings have been preserved in the mud,—the floor of hardened earth and the twisted branches and bark which formed the walls. Arms have been discovered in great quantities, tools, from swords in flint to needles in bone, ornaments, children's toys, the remains of stored-up fruits of various kinds, nay, even a cellar or receptacle full of corn, and a loaf of bread composed of bruised grain, and preserved by carbonization. By the side of these relics are found the bones of the animals which they slew in the chase, many belonging to species extinct before the rise of history, or barely mentioned in it. The urus, the bison, the elk, and the beaver furnished them with food and with the materials for some of their most ingeniously-constructed utensils. So plentiful and perfect are the remains found in the lakes that much more has been learned concerning the daily life and manners of men whose existence was not suspected ten years ago than is known of races which have left a famous name in history or tradition.

"THE ART-WORLD."—The new weekly periodical under this title, which devotes itself to the fine-arts, has been reduced in price. It is conducted by Mr. Henry Ottley.

SOCIETY OF BRITISH ARTISTS.—The thirty-ninth annual exhibition by this Society, now open in the Galleries, Suffolk-street, consists of 967 pictures and drawings, and nine pieces of sculpture. Though deficient in works of very striking merit, it includes some agreeable pictures, particularly in the department of landscape; and sales were effected on the private-view day and the Monday following, to the extent of 1,900*l.* We may return to it.

NATIONAL PORTRAIT GALLERY.—A return has been issued stating the attendance at this gallery. In 1859, the first year of its being open, admission was by tickets only, and the number of visitors in the year was 5,305. Early in 1860 the admission was made free, and in that year 6,392 persons visited the gallery. In 1861 the number rose to 10,907. The gallery is inconveniently lodged, and open only twice a week.

ABERDEEN.—The works of the new Grammar School for this city have been contracted for, at the sum of 9,330*l.* 13s. The following are the contractors:—Mr. A. Mitchell, for the mason work; Mr. J. Garvie, for the carpenter work; Mr. G. Davidson, for the slater work; Mr. W. Mearns, for the plaster work; Messrs. Hugh Gordon & Co., for the plumber work. The works will be begun immediately.

COST OF ALBUM PORTRAITS.—A curious fact, in connexion with the cost of production and the retail gain on album portraits came out in evidence in the case of Mayall *v.* Higby, tried in the Court of Exchequer a few days ago; when one of the witnesses stated that the cost of getting up these portraits was 1s. 9d. per dozen; and the wholesale price to the trade from 5s. to 8s. per dozen; the retail price at many shops being 1s. 6d. for a single copy; or about 1,000 per cent. profit on the first cost.

TENDERS.

For the formation and metalling of a portion of the new roads, Hampton Park Estate, Hereford. Messrs. Elmslie, Francy, & Haddon, architects, Malvern, London, and Hereford:—

Birchley	£642 17 8
Trumper	473 11 0
Walford	433 11 6
Scawdrett (accepted)	381 18 0

For house at Witham, Essex, for Mr. Charles Page. Mr. Frederick Chancellor, architect:—

Gardner	£667 0 0
Brown	665 0 0
Glasscock	660 0 0
Sandars (accepted)	600 0 0

For house in Long-alley, Bishopsgate. Messrs. Hovenden & Heath, architects. Quantities not supplied:—

Heeps	£339 0 0
Heath	304 0 0
Little	293 0 0
Henshaw (accepted)	279 0 0

For villa residence near Wargrave. Mr. Bryson, architect. Qantities supplied:—

Outhwaite	£1,597 0 0
Wheeler & Son	1,385 0 0
Architect's Tender	1,425 0 0

No. 1 contract for Italian chapel, George-yard, Hatton-wall. Mr. Bryson, architect. Quantities supplied:—

Patman & Co.	£4,120 0 0
Deards	3,997 0 0
Fish	3,490 0 0

For proposed new pair of double cottages at East Farleigh, Kent, for Mr. Gabriel Kennard. Mr. Joseph Hewitt, architect. Quantities supplied:—

Anscomb	£310 0 0
Reeves & Son (accepted)	308 0 0
Davis	270 0 0

For re-roofing and re-seating the Church of St. John Baptist, Brinklow. Mr. G. T. Robinson, archidiaconal architect:—

Denney	£1,075 0 0
Parnell	1,062 13 0
Bromwich	1,017 0 0
Hardy	920 0 0
Mault	890 0 0
Marriott	846 0 0
Bates (conditionally accepted)	777 0 0

For Moor Park Wesleyan Chapel, Preston. Messrs. Poulton & Woodman, Reading, architects:—

Tomlinson	£3,509 0 0
Bamber	3,297 0 0
Todd (accepted)	3,260 0 0

For alterations to house, Champion-hill, for Mr. R. G Cooper. Mr. W. Lee, architect. Quantities not supplied:—

Colls & Co.	£2,340 0 0
Fish	1,987 0 0
Newman & Mann	1,897 0 0
Beeton	1,761 0 0